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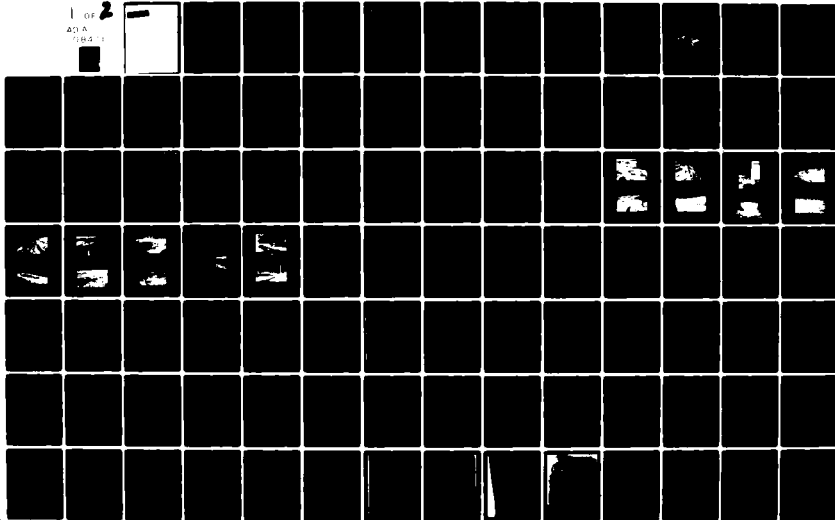
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NATIONAL PROGRAM OF INSPECTION OF NON-FEDERAL DAMS, TENNESSEE. --ETC(U)
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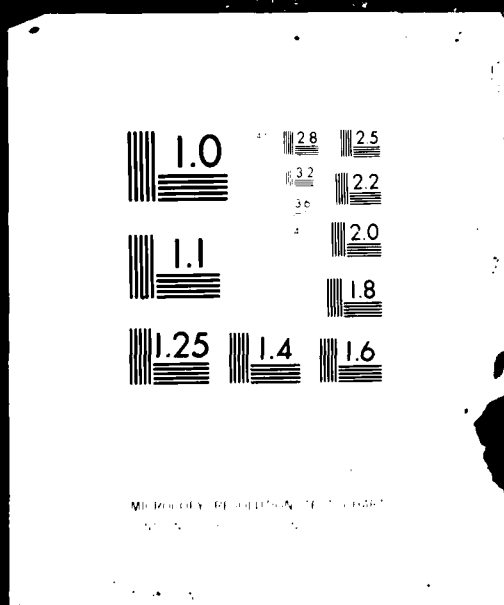
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Cane Creek Watershed Dam No. 19 is a linear earthen structure 2 550 feet long and 20.9 feet high with a crest width of 13 feet. It has upstream and downstream slopes of 1V:2.6H and 1V:3.1H respectively. The lake has 2.194 acre-feet of available flood storage, but it normally remains empty nine months out of the year. The reservoir has a drainage area of 3 315 acres (5.18 mi 2). It is predominantly farm and pastureland with an average ground slope of approximately 4%. The dam has a relatively uniform cross-section along most of its length. The crest undergoes little change in elevation and has a fairly constant width.		

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but ruts from vehicular traffic are predominant along much of the surface. The downstream slope of the dam is traversed by cattle trails nearly paralleling one another at different elevations from the toe to the dam crest. Some vehicular traffic has apparently also been occurring on the slope in the area of the principal spillway outlet. The upstream slope of the dam has been sloughed off below elevation 352 along most of the length of the dam. The embankment is reasonably well grassed and free of undesirable vegetation. There are some wet areas along the downstream toe but they are apparently pooled surface runoff and not the result of seepage. Because the reservoir was empty during the inspection, any active seepage flow that may normally occur did not appear, but no indications of a previous seepage flow were observed on the slope. The principal spillway consists of a reinforced concrete riser feeding a 156 foot, 30 inch diameter reinforced concrete culvert. The emergency spillway is an uncontrolled saddle type trapezoidal earthen channel at the left end of the dam. It has an 80 foot base, 1V:4.6H side slopes, and 2.1 feet of available head. OCE guidelines recommend that high hazard dams of intermediate size pass the full Probable Maximum Flood. Hydraulic and hydrologic analysis reveal that the dam will be overtopped by a maximum of 2.4 feet for 7.2 hours (AMC II) under the influence of this storm. The dam is given a condition classification of "unsafe nonemergency" because of its seriously inadequate spillway.



DEPARTMENT OF THE ARMY
NASHVILLE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1070
NASHVILLE, TENNESSEE 37202

21 SEP 1981

IN REPLY REFER TO

ORNED-G

Honorable Lamar Alexander
Governor of Tennessee
Nashville, TN 37219

Dear Governor Alexander:

Furnished herewith is the Phase I Investigation Report on Cane Creek Watershed Dam No. 19 near Ripley, Tennessee. The report was prepared under the authority and provisions of PL 92-367, the National Dam Inspection Act, dated 8 August 1972.

The report presents details of the field inspection, background information, technical analyses, findings, and recommendations for improving the condition of the dam.

Based upon the inspection and subsequent evaluation, Cane Creek Watershed Dam No. 19 is classified as unsafe-nonemergency due to insufficient storage and spillway capacity to pass the probable maximum flood.

We do not consider this an emergency situation at this time, but the recommendation concerning project modifications to allow safe passage of the design flood and others contained in this report should be undertaken in the near future to minimize the risk to the subdivision located immediately downstream.

Public release of the report and initiation of public statements fall within your prerogative. However, under provisions of the Freedom of Information Act, the Corps of Engineers is required to respond fully to inquiries on information contained in the report and to make it accessible for review on request.

Your assistance in keeping me informed of any further development. will be appreciated.

Sincerely,

Kenneth W. Oakley, LTC, Deputy Commander
for LEE W. TUCKER
Colonel, Corps of Engineers
Commander

1 Incl
As stated

CF:
Mr. Robert A. Hunt, Director
Division of Water Resources
4721 Trousdale Drive
Nashville, TN 37220


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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
TENNESSEE


Name of Dam Cane Creek Watershed Dam No. 19
County Lauderdale
Stream Hyde Creek - Tributary of Cane Creek
Date of Inspection March 12, 1981

This investigation and evaluation was prepared by the
Tennessee Department of Conservation, Division of Water
Resources.


PREPARED BY:


William Culbert, Jr.
Water Resources Engineer

APPROVED BY:


Edmond O'Neill
Chief Engineer
Safe Dams Section

APPROVED BY:


Robert A. Hunt, P.E.
Director, Division of
Water Resources
Tennessee Department
of Conservation

PREFACE

This report is prepared under guidance contained in the Department of the Army, Office of the Chief of Engineers, Recommended Guidelines for Safety Inspection of Dams, for a Phase I investigation. The purpose of the Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In the review of this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. Additional data or data furnished containing incorrect information could alter the findings of this report. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structures and may obscure certain conditions which might be detectable if inspected under the normal operating environment of the structure.

The analyses and recommendations included in this report are related to the hazard classification of the structure at the time of the report. Changes in conditions downstream of the dam may change the hazard classification of the structure. A change in hazard classification may in turn change the design flood on which the hydraulic and hydrologic analyses are based and may have a significant impact on the assessment of the safety of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions and is evolutionary in nature. It would be incorrect to assume that the present conditions of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspections can there be any chance that unsafe conditions will be detected.

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CANE CREEK WATERSHED DAM NO. 19
LAUDERDALE COUNTY
MARCH 28, 1981

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
TENNESSEE

Name of Dam Cane Creek Watershed Dam No. 19
County Lauderdale
Stream Hyde Creek, Tributary of Cane Creek
Date of Inspection March 12, 1981

ABSTRACT

Cane Creek Watershed Dam No. 19 is a linear earthen structure 2,550 feet long and 20.9 feet high with a crest width of 13 feet. It has upstream and downstream slopes of 1V:2.6H and 1V:3.1H respectively. The lake has 2,194 acre-feet of available flood storage, but it normally remains empty nine months out of the year. The reservoir has a drainage area of 3,315 acres (5.18 mi²). It is predominantly farm and pastureland with an average ground slope of approximately 4%.

The dam has a relatively uniform cross-section along most of its length. The crest undergoes little change in elevation and has a fairly constant width, but ruts from vehicular traffic are predominant along much of the surface. The downstream slope of the dam is traversed by cattle trails nearly paralleling one another at different elevations from the toe to the dam crest. Some vehicular traffic has apparently also been occurring on the slope in the area of the principal spillway outlet. The upstream slope of the dam has been sloughed off below elevation 352 along most of the length of the dam.

The embankment is reasonably well grassed and free of undesirable vegetation. There are some wet areas along the downstream toe but they are apparently pooled surface runoff and not the result of seepage. Because the reservoir was empty during the inspection, any active seepage flow that may normally occur did not appear, but no indications of a previous seepage flow were observed on the slope.

✓ The principal spillway consists of a reinforced concrete riser feeding a 156 foot, 30 inch diameter reinforced concrete culvert. The emergency spillway is an uncontrolled

saddle type trapezoidal earthen channel at the left end of the dam. It has an 80 foot base, 1V:4.6H side slopes, and 2.1 feet of available head.

OCE guidelines recommend that high hazard dams of intermediate size pass the full Probable Maximum Flood. Hydraulic and hydrologic analysis reveal that the dam will be overtopped by a maximum of 2.4 feet for 7.2 hours (AMC II) under the influence of this storm.

The dam is given a condition classification of "unsafe nonemergency" because of its seriously inadequate spillway.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
TENNESSEE

SECTION 1 - GENERAL

- 1.1 Authority - The Phase I inspection of this dam was carried out under the authority of Tennessee Code Annotated, Sections 70-2501 to 70-2530, The Safe Dams Act of 1973, and in cooperation with the U. S. Army Corps of Engineers under the authority of Public Law 92-367, The National Dam Inspection Act.
- 1.2 Purpose and Scope - The purpose of a Phase I investigation is to develop an engineering assessment of the general condition of a dam with respect to safety and stability. This is accomplished by conducting a visual inspection, reviewing any available design and construction data, and performing appropriate hydraulic, hydrologic, and other analyses. A comprehensive description of the Phase I investigation program is given in Recommended Guidelines for Safety Inspection of Dams, Department of the Army, Chief of Engineers, Washington, D. C. 20314.
- 1.3 Past Inspections - The dam was surveyed by State personnel as part of the original 1973 inventory. Another sight visit was made in May of 1980 to establish a hazard potential classification.
- 1.4 Details of Inspection - The Phase I inspection of Cane Creek Watershed Dam No. 19 was conducted on March 12, 1981. The weather was clear with moderate winds and a temperature of 55° F.
- 1.5 Inspection Team Members - The field inspection was conducted by the following State personnel:

George Moore, Regional Engineer
William Culbert, Regional Engineer
Anthony Privett, Engineering Co-op

SECTION 2 - DESCRIPTION

- 2.1 Location - The dam is located in Lauderdale County, Tennessee, approximately 8,000 feet south of the town of Ripley on Hyde Creek at approximate river mile 2.6. The site is shown on the USGS Ripley quadrangle (414NE) at latitude $35^{\circ}43'14''$ north and longitude $89^{\circ}32'17''$ west (location maps are provided in Appendix B).
- 2.2 History of Project - The dam was built in 1962 under the authority of the Watershed Protection and Flood Prevention Act (PL-566) as one of 24 floodwater retaining structures within the Cane Creek Watershed. Eighty percent of the project was federally funded. The Cane Creek Watershed District was responsible for providing the remainder of the cost through taxes levied on the property owners within the watershed. Design was by the SCS. Construction was by Hugh Dancey Construction Company of Memphis.

The structure is part of Orysa Farms and was originally owned by Mrs. Emina Durham. The ownership was later transferred to Mr. Charles R. Walker of Knoxville by his marriage to Mrs. Durham's daughter. Mr. and Mrs. James W. Koonce rent the property and manage the farm.

The lake remains empty nine months out of the year and is only partially filled during the winter months for duck hunting at the request of Mr. Koonce.

All operating and maintenance procedures are the responsibility of the Cane Creek Watershed District with minor maintenance jobs being done by the landowner (or farm workers) as part of regular farm operations.

- 2.3 Size and Hazard Classification - Based on a maximum storage capacity of 2,400 acre-feet (including sediment pool) the dam is assigned a size classification of "intermediate". A federal hazard potential classification of "high" was chosen for the site because a sudden failure of the structure could possibly result in the loss of life of dozens of individuals living 2,700 feet downstream of the dam in a trailer park. An Illinois Central Rail line and a U. S. Highway 1,700 feet and 2,800 feet downstream respectively would also be affected (see photo nos. 16 & 17).

2.4 Description of Dam and Appurtenances

- 2.4.1 Geology (Excerpt from Watershed Work Plan) - The watershed lies upon unconsolidated sediments of the Mississippi embayment of the Gulf Coastal Plain. The watershed is blanketed with a thick layer of brown silty loess. The thickness of the loess blanket ranges from about 50 feet in the western part of the watershed to about 20 feet in the extreme eastern part. This loess blanket is made up of three distinct sheets which were deposited at different periods. These sheets are represented by the Peorian and Farmdale periods of loess deposition. The third or oldest sheet may possibly correlate with the Loveland period of loess deposition.

On the highest ridges within the watershed are found beds of gravel beneath the loess blanket. These gravels are of Pliocene age. Beneath the entire watershed are found sediments of the Jackson formation of upper Eocene age.

The extensive valley terraces in the lower part of the watershed and along the north side of Cane Creek were formed during the latter part of the Wisconsin stage in the Pleistocene epoch.

- 2.4.2 Embankment - The dam is a linear earthen structure 2,550 feet long and 20.9 feet high with a crest width of 13 feet. The upstream and downstream slopes are 1V:2.6H and 1V:3.1H respectively. The crest elevation varies between 357.5 and 356.4 feet msl along the length of the dam.

According to the "as built" drawings, a keyway was excavated to a low elevation of 333 feet msl with a 10 foot base and 1V:2H side slopes. No embankment drain was constructed because, according to SCS personnel, the dam was designed strictly as a flood control structure and was never intended to impound water for an extended duration.

- 2.4.3 Service Spillway and Drawdown Facilities - The principal spillway is a 7.5' X 2.5' inside diameter rectangular reinforced concrete riser 14 feet high above the pipe invert. It feeds a 30 inch steel cylinder reinforced concrete pipe (Spec. AWWA C-301) 156 feet long. The culvert

is fitted with rubber gaskets at joints with an asphalt mastic sealant. Six 7' X 9' antiseep collars were constructed along the culvert. The drawdown is an 18 inch formed opening with thimble inset at the upstream base of the riser. It is regulated by a 24 inch square sliding headgate controlled manually from the top of the riser.

- 2.4.4 Emergency Spillway - The emergency spillway is an uncontrolled saddle type earthen channel located at the left end of the dam. It has a trapezoidal cross-section with an 80 foot base width, 1V:4.6H side slopes, and 2.1 feet of available head (control section elevation 354.3). Its entrance and exit channels are sloped at 2 and 3% respectively.
- 2.5 Downstream Channel - The downstream channel has an approximately triangular cross-section with a 10 foot top width and approximately 5 feet of depth. It lies on a 0.3% slope. (See photo no. 11).
- 2.6 Reservoir and Drainage Area - At elevation 352.0 the dam impounds a 236 acre lake with 833 acre-feet of storage. Sediment has filled the basin to within a few tenths of a foot of the low stage inlet (elevation 346.5). At the top of the dam, elevation 356.4, the lake area increases to 387 acres with a maximum impoundage of 2,194 acre-feet.

The drainage area of the lake is 3,315 acres. It is predominantly farm and pasturelands with an average ground slope of approximately 4.1%.

SECTION 3 - FINDINGS

3.1 Visual Inspection

- 3.1.1 Embankment - The dam has a uniform cross-section over most of its length. The junction of the slope faces of the embankment with natural ground and with the dam crest are all well defined and easily located. The crest is unusually flat for a dam of its length. It varies in elevation between 357.5 and 356.4, but there is only 0.5 foot variation in elevation along 96% of its length.

The structure is reasonably well grassed and free of undesirable vegetation.

Cattle traffic along the downstream slope has covered much of the surface with small superficial depressions, and the trails paralleling the dam create a stepped appearance in many locations (see photo nos. 7, 8, 9, and 10). A few larger depressed or eroded areas appear sporadically along the slope. They appear to have been initiated by cattle also, and are not deep enough or cover a large enough area to warrant concern (see photo no. 7).

No indications of seepage were observed on the embankment or in the area immediately downstream. A few wet areas do exist along the toe, however, their restriction to low lying areas indicates that they are probably due to pooled surface runoff (see photo no. 10). Impounding water at the sediment pool level for only a few months out of the year gives the embankment little opportunity to develop seepage problems.

The upstream slope of the dam has sloughed off from elevation 352 (elevation of high stage riser inlet) down to the sediment pool at elevation 346.5 along most of the length of the dam. Above elevation 352 the slope is well grassed and uniform with no noteworthy disfigurements.

A soil sample taken from the embankment crest at a depth of about 1 foot indicates a CL type material (see soil test in Appendix D).

- 3.1.2 Service Spillway - The service spillway appears to be in excellent condition. The riser shows no significant signs of spalling or other weathering. There is, however, considerable debris at the draw-down that could obstruct flow (see photo nos. 5 and 6).

The pipe outlet gives the appearance that the culvert may also be in good condition. It is free of noteworthy weathering and gives no indication that seepage may have occurred around its periphery (see photo no. 12).

- 3.1.3 Emergency Spillway - The emergency spillway is clear and uniform along its entire length. It is well grassed and free of undesirable vegetation and has no significant erosion. Like the embankment the emergency spillway has well defined boundaries. There is less than 0.2 foot variation in elevation along its 80 foot base. The side slopes are approximately the same and the critical section of the channel occurs along the centerline of the dam. The SCS District Conservationist in Ripley confirms that flood water in the reservoir has never been within two feet of the spillway crest.

- 3.1.4 Downstream Channel - The downstream channel is relatively straight and uniform with a typical triangular cross-section for approximately 1,600 feet downstream of the dam. It is heavily grassed and hosts several 1-2 inch diameter trees. No significant obstructions occur in the channel within view from the dam (see photo no. 11).

- 3.2 Review of Data - The data available for review consists of the Watershed Work Plan prepared by the Cane Creek Watershed District and the Lauderdale County Soil Conservation District. A copy of the SCS "as built" plans including stage/storage information and watershed data was also reviewed. The information obtained is contained in other sections of this report.

- 3.3 Static and Seismic Stability Assessment - Determination of the actual margin of safety for static stability is beyond the scope of this Phase I investigation, however, an assessment of the embankment stability based on visual evidence and engineering judgment would indicate a stable structure.

The dam is located in Seismic Zone 3, indicating that major damage could be expected to occur to a structure in the event of seismic activity.

- 3.4 Hydrologic and Hydraulic Analysis - According to OCE guidelines, high hazard dams in the intermediate size classification are expected to pass the Full Probable Maximum Flood (PMF). Analysis reveals that runoff from this storm will overtop the dam by a maximum of 2.4 feet for 7.2 hours (AMC II). The $\frac{1}{2}$ PMF will overtop the dam by a maximum of 1.0 foot for 5.7 hours.

3.5 Conclusions and Recommendations

- 3.5.1 Conclusions - The dam is in Seismic Zone 3, indicating that major damage could be expected in the event of seismic activity.

Because the lake basin was empty at the time of the inspection, a thorough evaluation of seepage could not be made, but because the structure does not regularly impound more than a few feet of water at most, seepage is not believed to be a problem.

A significant amount of sloughing has occurred along the upstream slope of the dam.

No cracks, slides, or signs of differential settlement were observed on the embankment.

The emergency spillway is inadequate to pass the full PMF as recommended by OCE guidelines for high hazard dams of intermediate size.

The dam is assigned a federal condition classification of "unsafe - nonemergency" primarily because of its seriously inadequate spillway.

- 3.5.2 Recommendations - The Cane Creek Watershed District Board should:

1. Retain a qualified engineer to make recommendations for spillway enlargement to pass the design flood and to determine if the embankment meets stability requirements for seismic loading conditions.

2. Provide some type of slope stabilization or other protection for the upstream slope of the dam.
3. Clear the debris from the natural channel around the mouth of the drawdown.
4. Repair rutting and trail formation on the crest and downstream slope of the dam.
5. Keep cattle and unauthorized vehicles off of the embankment.
6. Have the dam reinspected when it is impounding water.
7. Continue a program of regular inspection and maintenance.
8. Develop an emergency action plan to warn downstream residents in the event a serious problem develops with the dam.

SECTION 4 REVIEW BOARD FINDINGS

The Interagency Review Board for the National Program of Inspection of Non-Federal Dams met in Nashville on 30 July 1981 to examine the technical data contained in the Phase I investigation report on Cane Creek Watershed Dam No. 19. The Review Board considered the information and recommended that a qualified engineer should be engaged to recommend project modifications to allow safe passage of the $\frac{1}{2}$ PMF. They agreed with other report conclusions and recommendations. A copy of the letter report presented by the Review Board is included in Appendix G.

APPENDIX A
-
DATA SUMMARY

APPENDIX A
DATA SUMMARY

A.1 Dam

A.1.1 Type - Earthfill

A.1.2 Dimensions and Elevations

- a. Crest length - 2,550 feet
- b. Crest width - 13 feet
- c. Height - 20.9 feet
- d. Crest elevation (low point) - 356.4' msl
- e. Upstream slope - 1V:2.6H (very little of slope is unaltered from wave action or sediment)
- f. Downstream slope - 1V:3.1H
- g. Size classification - Intermediate

A.1.3 Zones, Cutoffs, and Grout Curtains - A cutoff trench with 1V:2H side slopes and a 10 foot base width runs along the centerline of the dam. Excavation extends to a maximum depth of approximately 332 feet msl.

A.1.4 Instrumentation - None

A.2 Reservoir and Drainage Area

A.2.1 Reservoir

a. Normal Pool

- 1) Elevation - Low stage riser elevation - 346.5' msl
High stage - 352.0' msl. 1972 edition USGS quadrangle indicates a pool elevation of 345' msl (below that of the low stage inlet). Field inspection of sloughing along upstream slope indicates that the water level must have been as high as elevation 352 for an extended duration.

- 2) Surface area - Elev. 346.5 - 83 acres
Elev. 352 - 236 acres
- 3) Storage capacity - Elev. 346.5 - Insignificant
(sediment fills reservoir almost to low
stage inlet)
Elev. 352.0 - 833 acre-feet
available, 1039 acre-feet including sediment
pool
- 4) Reservoir length - Elev. 346.5 - 4,100'
Elev. 352 - 8,600'

b) Maximum Pool (designated top of dam)

- 1) Elevation - 356.4' msl
- 2) Surface area - 387 acres
- 3) Capacity - Total - 2,400 acre-feet
Available - 2,194 acre-feet

A.2.2 Drainage Area

- a. Size - 3,315 acres (5.18 mi²)
- b. Average ground slope - 4.1%
- c. Soils - Upper elevs. - Memphis, Loring, Grenada
Lower elevs. - Richland, Olivier, Calhoun
- d. Land use - Pasture, idle land, row crops
- e. Runoff (AMC II) (AMC III)

1) PMF - 25.6"	27.6"
2) 0.5 PMF - 12.8"	13.8"
3) 100 year - 2.9"	4.1"

A.3 Outlet Structures

A.3.1 Service Spillway

- a. Type - Reinforced concrete pipe
- b. Size - 30" diameter
- c. Pipe gradient - 1.6%
- d. Drawdown - 18" diameter round wall thimble
opening controlled by 24" square sliding headgate
- e. Capacity - 102 cfs

A.3.1 Emergency Spillway

- a. Type - Uncontrolled saddle, trapezoidal cross-section
- b. Crest elevation - 354.3' msl
- c. Size - Base - 80'
Side slopes - Approx. 4.6H:1V
Head - 2.1'

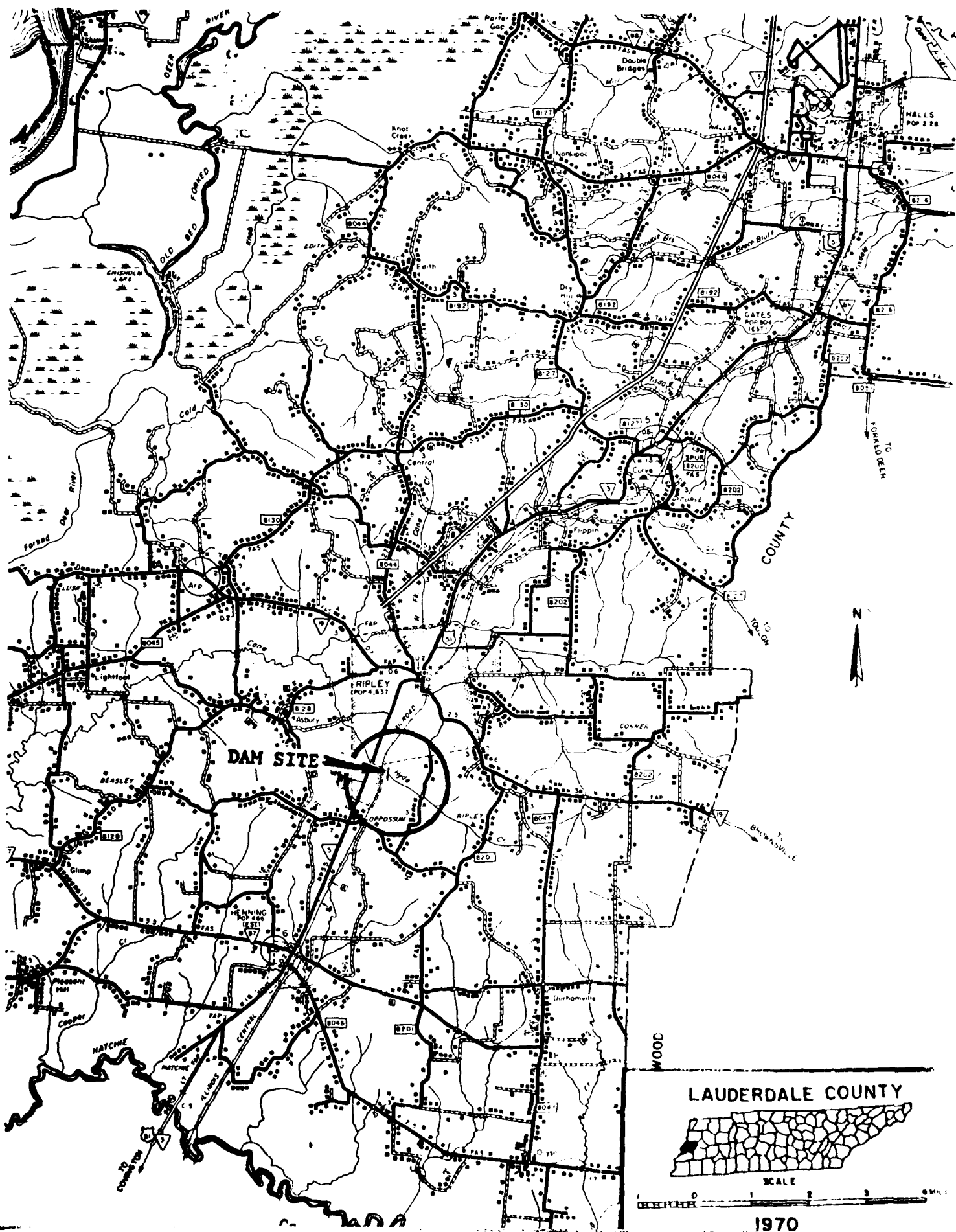
A.4 Historical Data

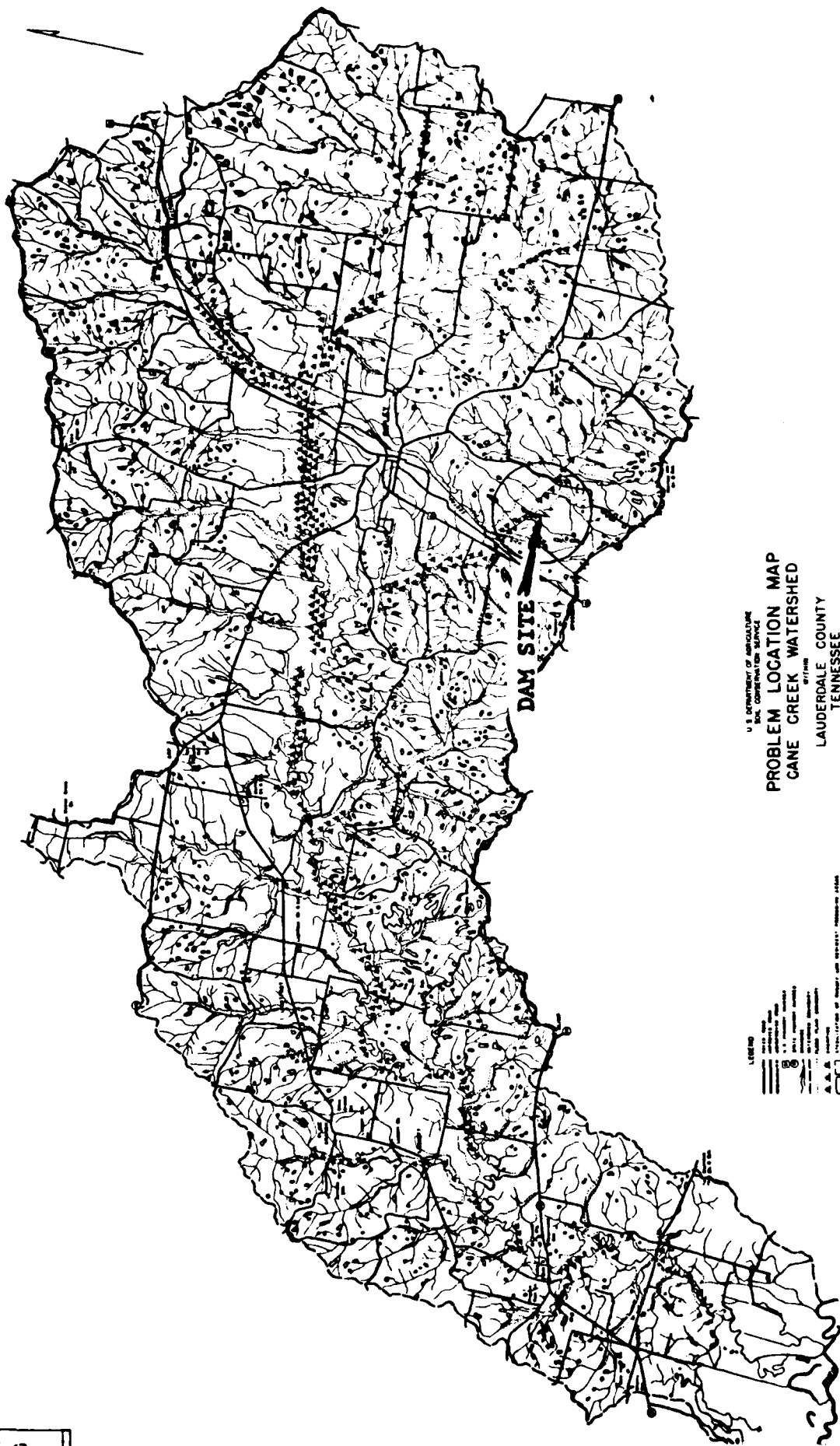
- A.4.1 Construction Date - 1962
- A.4.2 Design - SCS
- A.4.3 Builder - Hugh Dancey
- A.4.4 Owner - Charles Rice Walker
- A.4.5 Previous Inspections - The dam was originally surveyed by State personnel as part of the 1973 inventory. A site visit was again made in May of 1980.
- A.4.6 Seismic Zone - 3
- A.4.7 Operation and Maintenance - Operation and maintenance of the dam is the responsibility of the Cane Creek Watershed District Board. Minor maintenance duties are to be performed by the property owners as part of regular farm operations. Other maintenance requirements are to be performed through force contract with funds raised for this purpose by taxation of property owners within the watershed.

A.5 Downstream Hazard Data

- A.5.1 Downstream Hazard Classification - High
- A.5.2 Persons in Likely Flood Path - As many as 100 (est.)
- A.5.3 Downstream Property - Trailer park, U.S. Hwy, county road
- A.5.4 Warning System - None

APPENDIX B
SKETCHES AND LOCATION MAPS





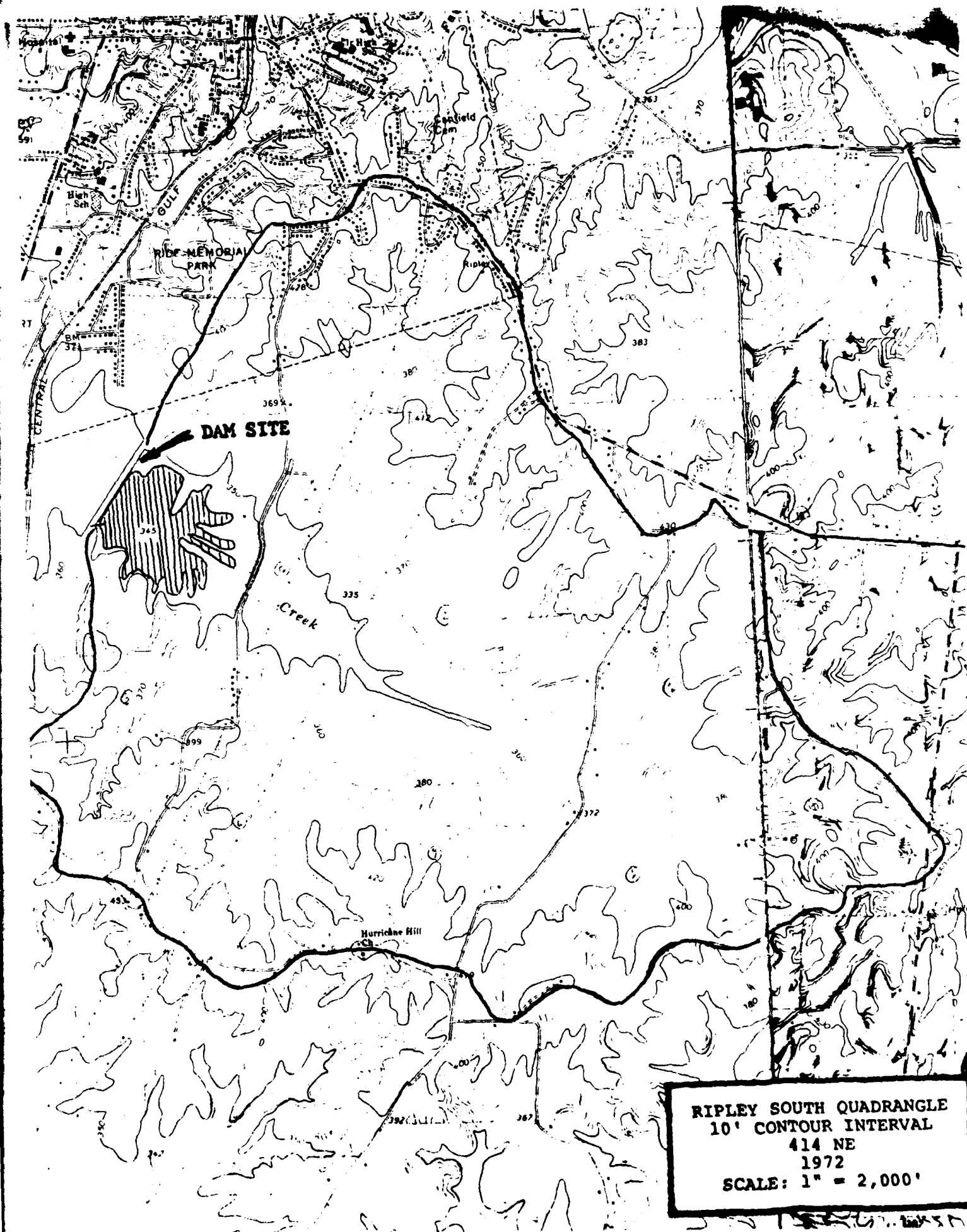
U.S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE
PROBLEM LOCATION MAP
CANE CREEK WATERSHED
 8717400
 LAUDERDALE COUNTY
 TENNESSEE



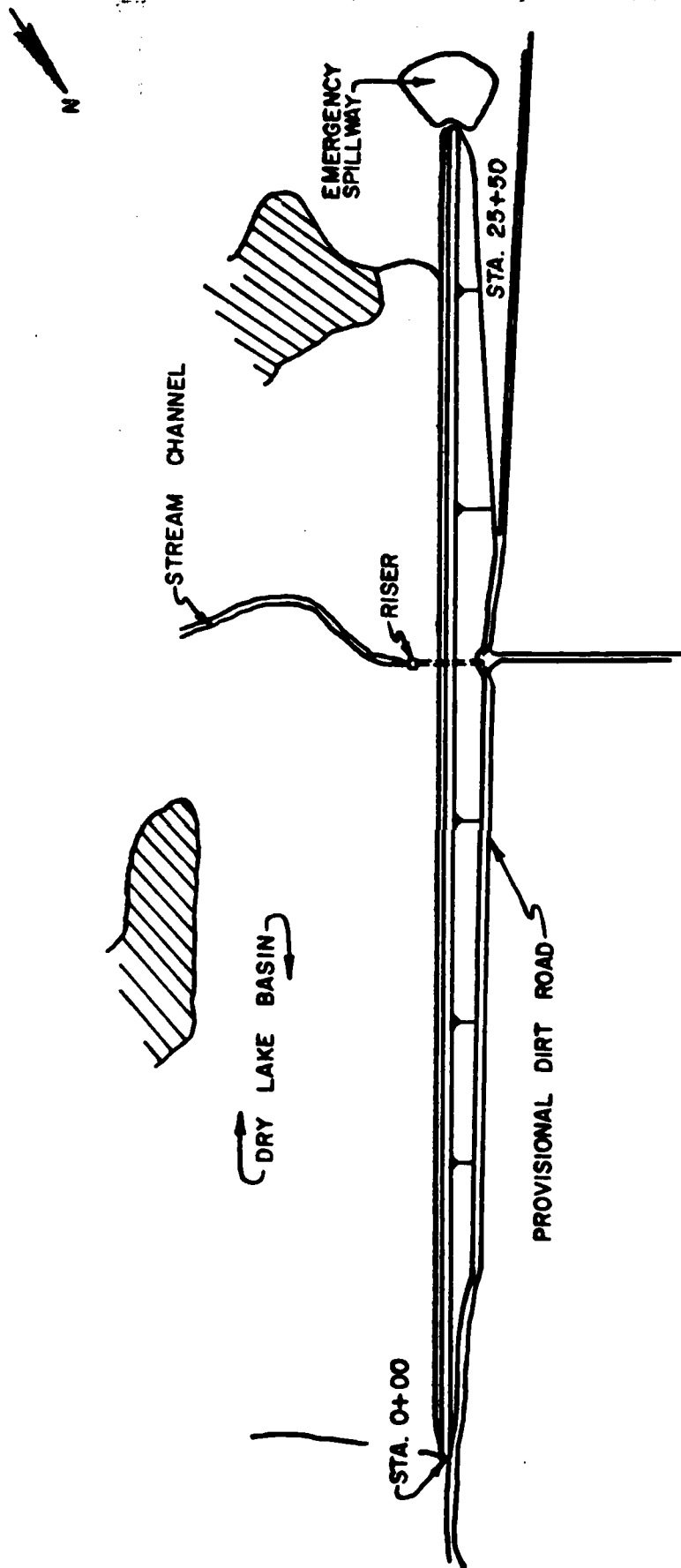
LEGEND

1	Major Road
2	Minor Road
3	Stream
4	Contour Line
5	Spot Elevation
6	Public Land
7	Private Land
8	Water
9	Settlement
10	Other

U.S. GOVERNMENT PRINTING OFFICE: 1967 O 344-000



RIPLEY SOUTH QUADRANGLE
10' CONTOUR INTERVAL
414 NE
1972
SCALE: 1" = 2,000'



//// - POOLED WATER

GENERAL PLAN
SCALE: 1" = 300'

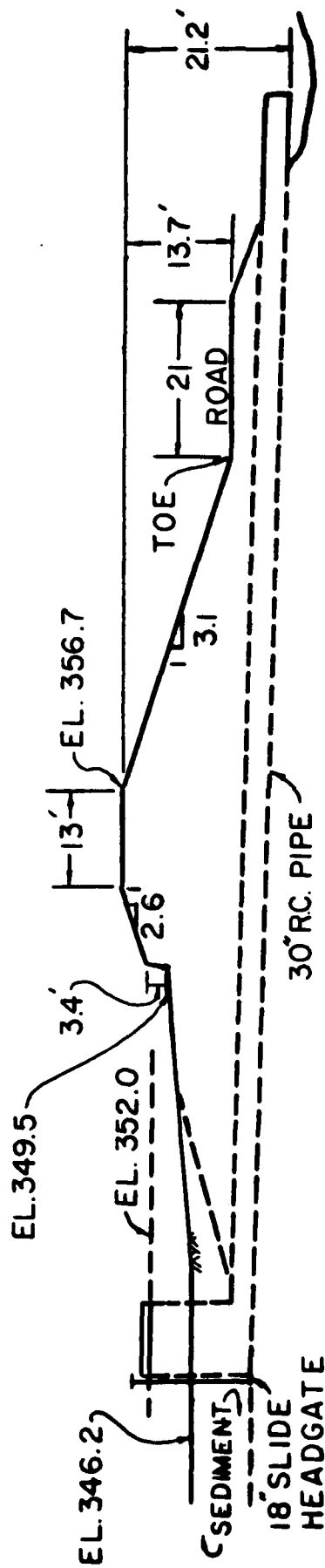
CANE CREEK DAM

#19

DRAWN BY: W.M.C.

DATE: 5/29/81

SHEET: 1 OF 5



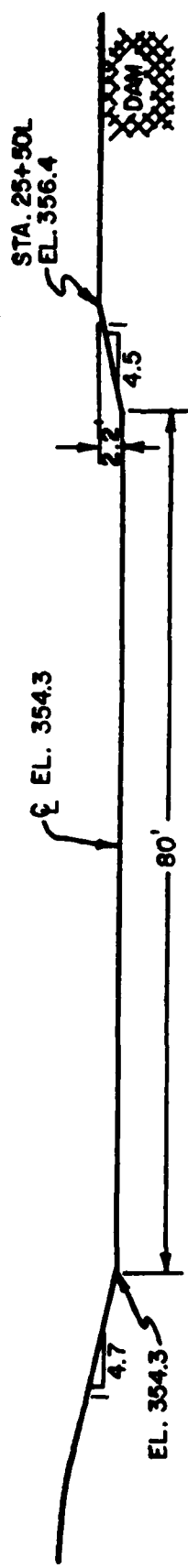
MAXIMUM SECT. AT STAT. 15+30L

SCALE 1"=20'

NOTES: 1) ALL ELEVS. REFERENCED TO HIGH STAGE INLET EL. 352.0
AS GIVEN ON SCS DESIGN DRAWINGS

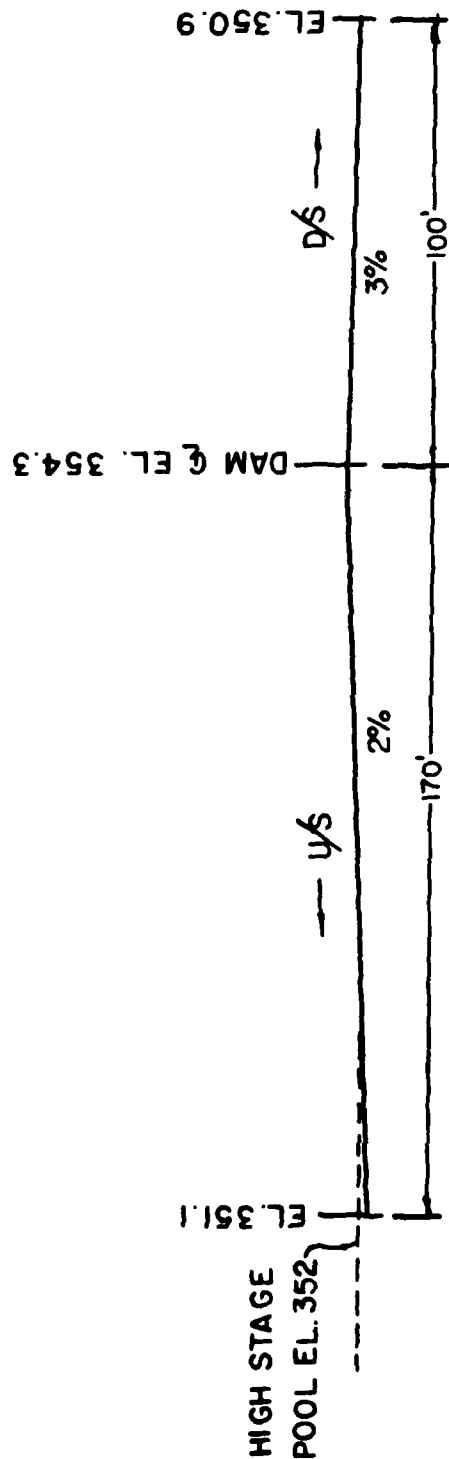
2) BASIN WAS EMPTY AT TIME OF INSECTION

CANE CREEK DAM #19
DRAWN BY: W.C. DATE: 5-26-81 SHEET 2 OF 5



EMERGENCY SPILLWAY CONTROL SECTION
SCALE: 1" = 15'

CANE CREEK DAM 19	DRAWN BY: G.A.D. DATE: 5/28/81 SHEET: 3 OF 5
----------------------	--



EMERGENCY SPILLWAY PROFILE

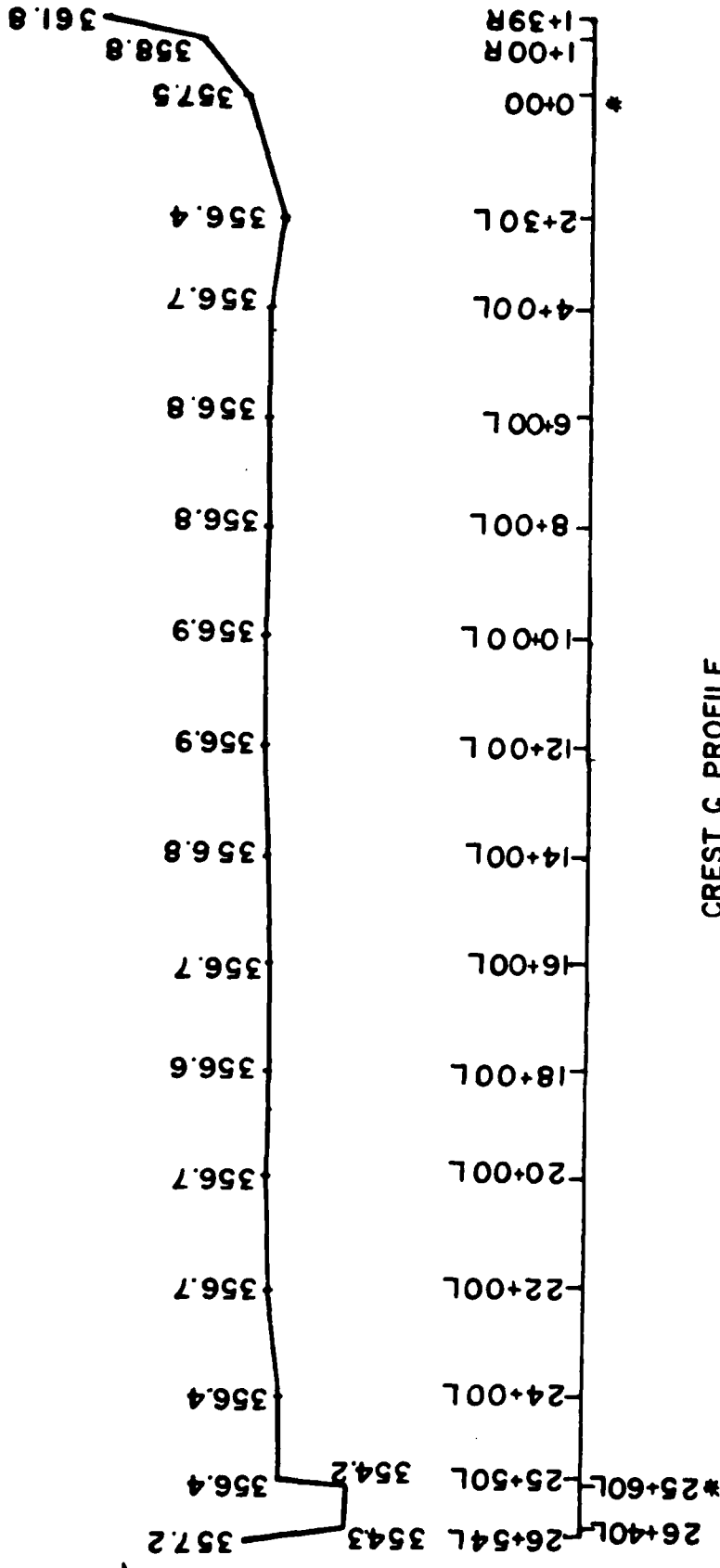
SCALE 1" = 40'

CANE CREEK DAM # 19	DRAWN BY: W.C. DATE: 5-22-81 SHEET: 4 OF 5
------------------------	--

CANE CREEK DAM # 19	DRAWN BY: W.C. DATE: 5-26-81 SHEET: 5 OF 5
------------------------	--

CREST & PROFILE

H SCALE: 1" = 300'
V SCALE: 1" = 5'



APPENDIX C
PHOTOGRAPHIC RECORD

Photographic Record

- Photo No. 1 - Aerial shot from downstream of dam.
- Photo No. 2 - Aerial shot from upstream of dam.
- Photo No. 3 - Dam crest looking left from near right end.
- Photo No. 4 - Upstream slope showing sloughing and sediment tapering toward lake floor.
- Photo No. 5 - Riser showing debris in natural channel at drawdown.
- Photo No. 6 - Riser showing low stage rectangular inlet on upstream side.
- Photo Nos. 7 & 8 - Typical appearance of downstream slope showing cattle trails and tufts of grass from adjacent cattle hoof depressions.
- Photo No. 9 - Trails from vehicular and cattle traffic along dam toe at midsection.
- Photo No. 10 - Pooled surface runoff at toe left of center.
- Photo No. 11 - Plunge pool and natural stream channel.
- Photo No. 12 - Principal spillway outlet.
- Photo No. 13 - Emergency spillway entrance channel looking upstream from control section.
- Photo No. 14 - Emergency spillway exit channel looking downstream from control section.
- Photo No. 15 - View of dam, right of principal spillway, from downstream.
- Photo No. 16 - Trailer park and U. S. Highway 51 in background.
- Photo No. 17 - Trailer park ninety degrees right of Photo No. 16. Hyde Creek runs under bridge where car is crossing.

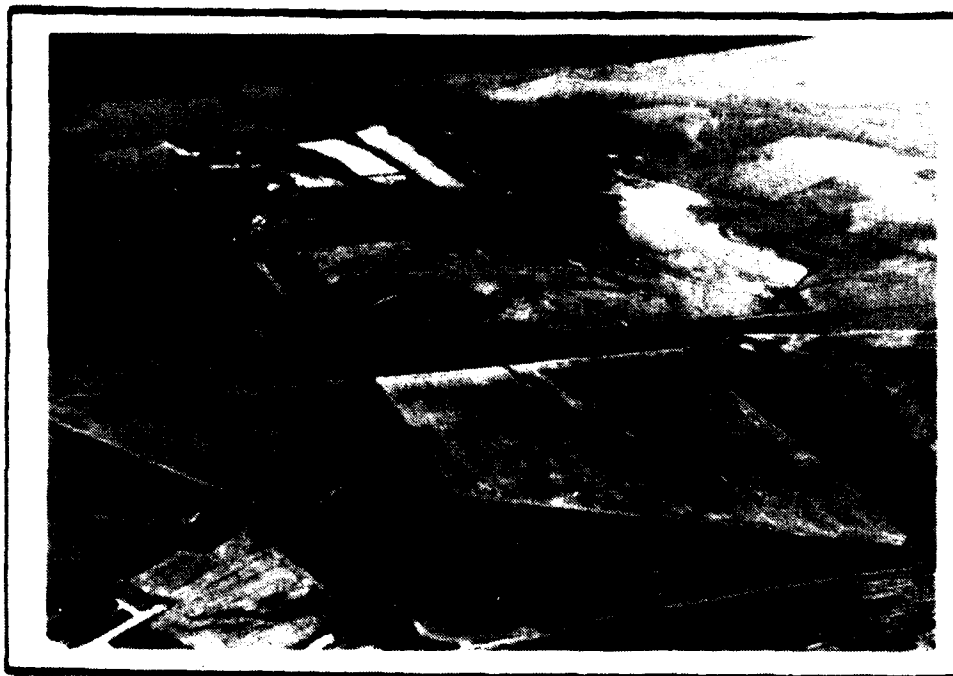


PHOTO NO.1



PHOTO NO.2



PHOTO NO. 3

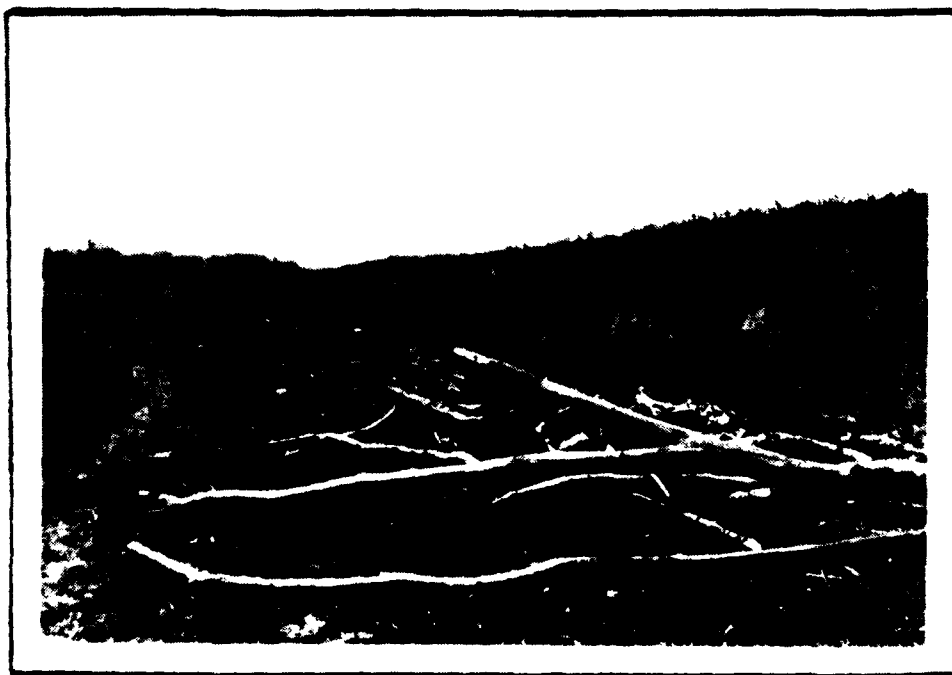


PHOTO NO. 4



PHOTO NO. 5

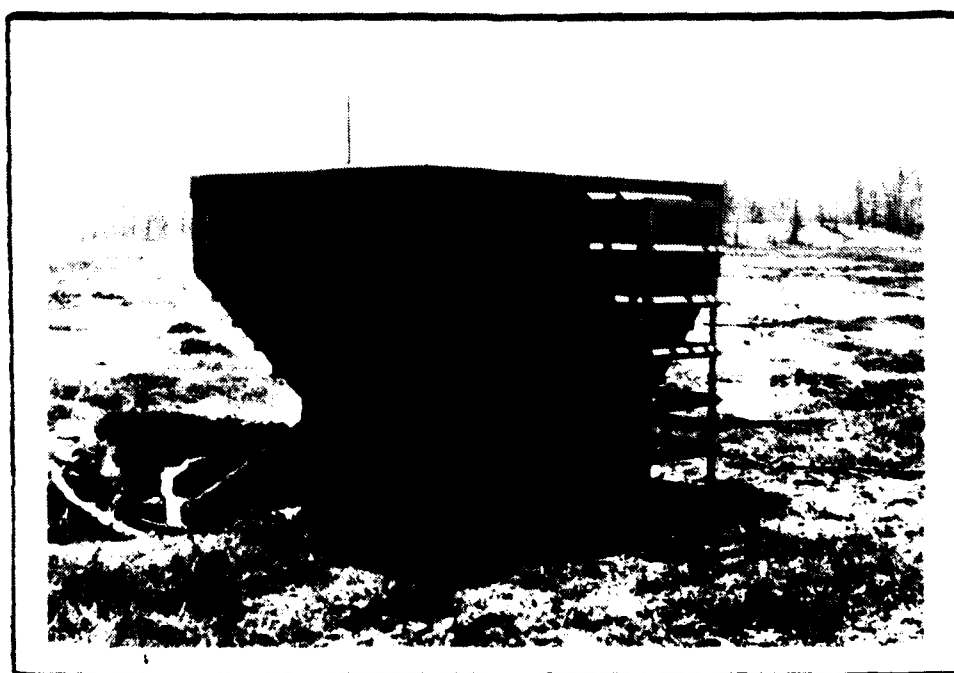


PHOTO NO. 6

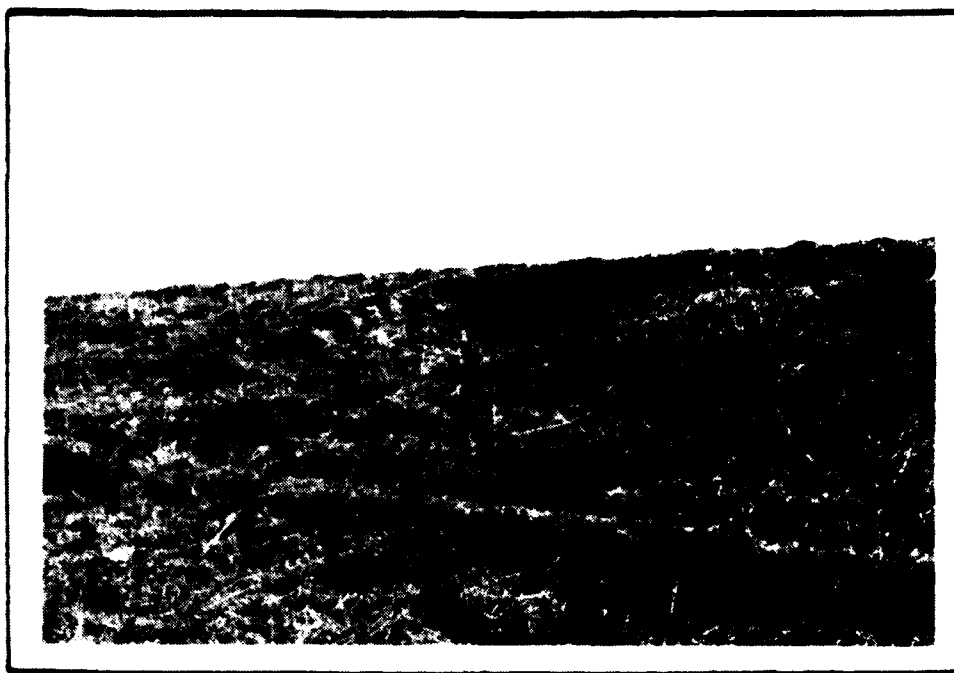


PHOTO NO. 7



PHOTO NO. 8



PHOTO NO.9



PHOTO NO.10



PHOTO NO .11



PHOTO NO .12



PHOTO NO .13



PHOTO NO .14



PHOTO NO. 15



PHOTO NO .16

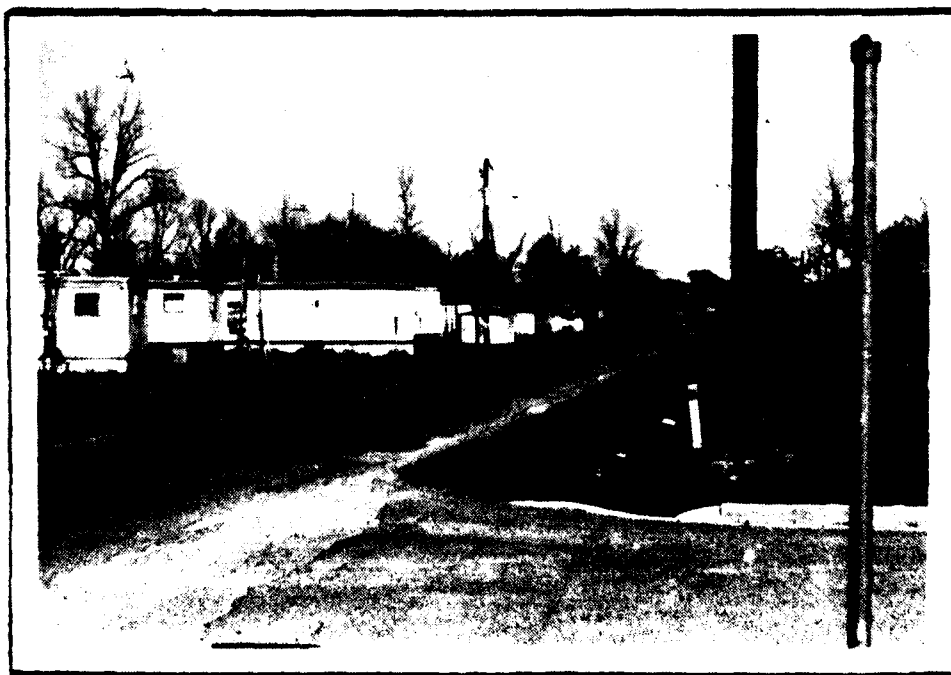


PHOTO NO .17

APPENDIX D

TECHNICAL CRITIQUE
CHECKLISTS FOR VISUAL INSPECTION
ENGINEERING DATA
SOIL TESTS

Check List
Visual Inspection of Earth Dams
Department of Conservation
Division of Water Resources

Name of Dam Cane Creek No. 19

County Lauderdale Date of Inspection 3/12/81

ID # - State 49-7005 Federal TN-09705

Type of Dam Earth

Hazard Category-Federal High State 1

Weather Clear; moderate winds Temperature 55°

Pool at Time of Inspection N/A-dry (distance from crest)
few

Tailwater at Time of Inspection tenths (distance from stream bed)

Design/As Built Drawings Available: Yes X No

Location: As built - SCS, Nashville office

Copy Obtained: Yes X No

Reviewed: Yes X No

Construction History Available: Yes No X

Location:

Copy Obtained: Yes No

Reviewed: Yes No

Other Records and Reports Available: Yes X No

Location: Watershed Work Plan - SCS, Nashville

Copy Obtained: Yes X No

Reviewed: Yes X No

Prior Incidents or Failures: Yes No X

Inspection Personnel and Affiliation:

Bill Culbert - TDWR

George Moore - TDWR

Anthony Privett - TDWR

I. Embankment

A. Crest

Description (1st inspection) Straight

1. Longitudinal Alignment Good

2. Longitudinal Surface Cracks None seen.

3. Transverse Surface Cracks None seen.

4. General Condition of Surface Poor; rutted by
traffic.

5. Miscellaneous Minor erosion around fence near
right end,

B. Upstream Slope

1. Undesirable Growth or Debris Slight accumulation of
debris at and below normal pool level.

2. Sloughing, Subsidence, or Depressions Benching and
minor sloughs due to undercutting.

3. Slope Protection Vegetative only.

a. Condition of Riprap None

b. Durability of Individual Stones N/A

c. Adequacy of Slope Protection Against Waves
and Runoff Poor; benched; about 3-4' vertical
drop.

d. Gradation of Slope Protection - Localized Areas
of Fine Material N/A

4. Surface Cracks Few around sloughs.

C. Downstream Slope

1. Undesirable Growth or Debris None

2. Sloughing, Subsidence, or Depressions; Abnormal
Bulges or Non-Uniformity Surface very rough due to
cattle; some ruts due to vehicles above service
spillway outlet; 1 gully forming about 300-400' from
right end of dam.
3. Surface Cracks on Face of Slope None seen.
4. Surface Cracks or Evidence of Heaving at
Embankment Toe None seen
5. Wet or Saturated Areas or Other Evidence of Seepage
on Face of Slope; Evidence of "Piping" or "Boils"
None seen
6. Drainage System None seen
7. Fill Contact with Outlet Structure Good
8. Condition of Grass Slope Protection Generally good.

D. Abutments

1. Erosion of Contact of Embankment with Abutment from
Surface Water Runoff, Upstream or Downstream _____

None seen.

2. Springs or Indications of Seepage Along Contact of
Embankment with the Abutments _____ None seen.
-
-

3. Springs or Indications of Seepage in Areas a Short
Distance Downstream of Embankment - Abutment Tie-in

None seen.

II. Area Downstream of Embankment, Including Channel

- A. Localized Subsidence, Depressions, Sinkholes, Etc.** _____
Few low areas holding water probably due to field road
below dam.
- B. Evidence of "Piping", "Boils", or "Seepage"** _____
None seen.
- C. Unusual Presence of Lush Growth, such as Swamp
Grass, etc.** _____ None seen.
- D. Unusual Muddy Water in Downstream Channel** _____ None seen.
- E. Sloughing or Erosion** _____ Minor erosion left side of
channel.
- F. Surface Cracks or Evidence of Heaving Beyond
Embankment Toe** _____ None seen.
- G. Stability of Channel Sideslopes** _____ Good
- H. Condition of Channel Slope Protection** _____ None; vegetative
only.

I. Adequacy of Slope Protection Against Waves, Currents,
and Surface Runoff O.K.

J. Miscellaneous _____

K. Condition of Relief Wells, Drains, and Other
Appurtenances None seen.

L. Unusual Increase or Decrease in Discharge from
Relief Wells N/A

III. Instrumentation - None seen

A. Monumentation/Surveys _____

B. Observation Wells _____

C. Weirs _____

D. Piezometers _____

E. Other _____

IV. Spillways

A. Service Spillway (Service/Emergency Combination Yes No X)

1. Intake Structure Condition Good

2. Outlet Structure Condition Good

3. Pipe Condition Good from outlet.

4. Evidence of Leakage or Piping None seen.

5. General Remarks Excessive debris around inlet structure.

B. Emergency Spillway

1. General Condition Good. Uniform cross-section.
Full grass cover.

2. Entrance Channel Good

3. Control Section Good

3. Exit Channel Good

4. Vegetative/Woody Cover Grass only. Full and uniform.

5. Other Observations _____

V. Emergency Drawdown Facilities (if part of service spillway
so state) Valve on service spillway riser open prior to
inspection.

Are Facilities Operable: Yes _____ No _____ Unknown

Were Facilities Operated During Inspection: Yes _____ No X

Date Facilities Were Last Used Unknown

VI. Reservoir

- A. Slopes Gradual to moderate

- B. Sedimentation High. Approximately 8 feet of
sediment above drawdown invert.

- C. Turbidity N/A

VII. Drainage Area

- Description (for hydrologic analysis) Predominantly
pasture and idle land. Some sporadic wooded areas and
low density residential mostly around downstream
periphery.

- A. Changes in Land Use Increasing residential.

VIII. Downstream Area (Stream)

- A. Condition (obstructions, debris, etc.) Okay.
No significant obstructions.
- B. Slopes Okay. Approximate 0.3% channel slope.
- C. Approximate No. Homes, Population, and Distance D/S
Trailer park 2,500 feet downstream - approximately
2 dozen trailers estimated 100 people.
- D. Other Hazards Railroad about 1,200 feet downstream.
U. S. Highway approximately 2,800 feet downstream.

IX. Miscellaneous

Incidents/Failures None known.

Observed Geology of Area Less than 50% of particles of fill sample are discernable with the naked eye, indicating a silt or clay. Field dilatancy test indicates a silt clay mixture. Surrounding natural land is mostly silt.

X. Conclusions

Deficient, due to benching of upstream slope.

Hydraulic and hydrologic analysis pending.

XI. Recommendations

- 1) Repair benching and install appropriate wave protection on upstream slope prior to impounding water.
- 2) Remove debris accumulated around service spillway riser.
- 3) Repair erosion and rutting on crest and downstream slope.
- 4) Drain wet areas occurring along toe.

William F. G. [Signature]
Regional Engineer

Chief Engineer

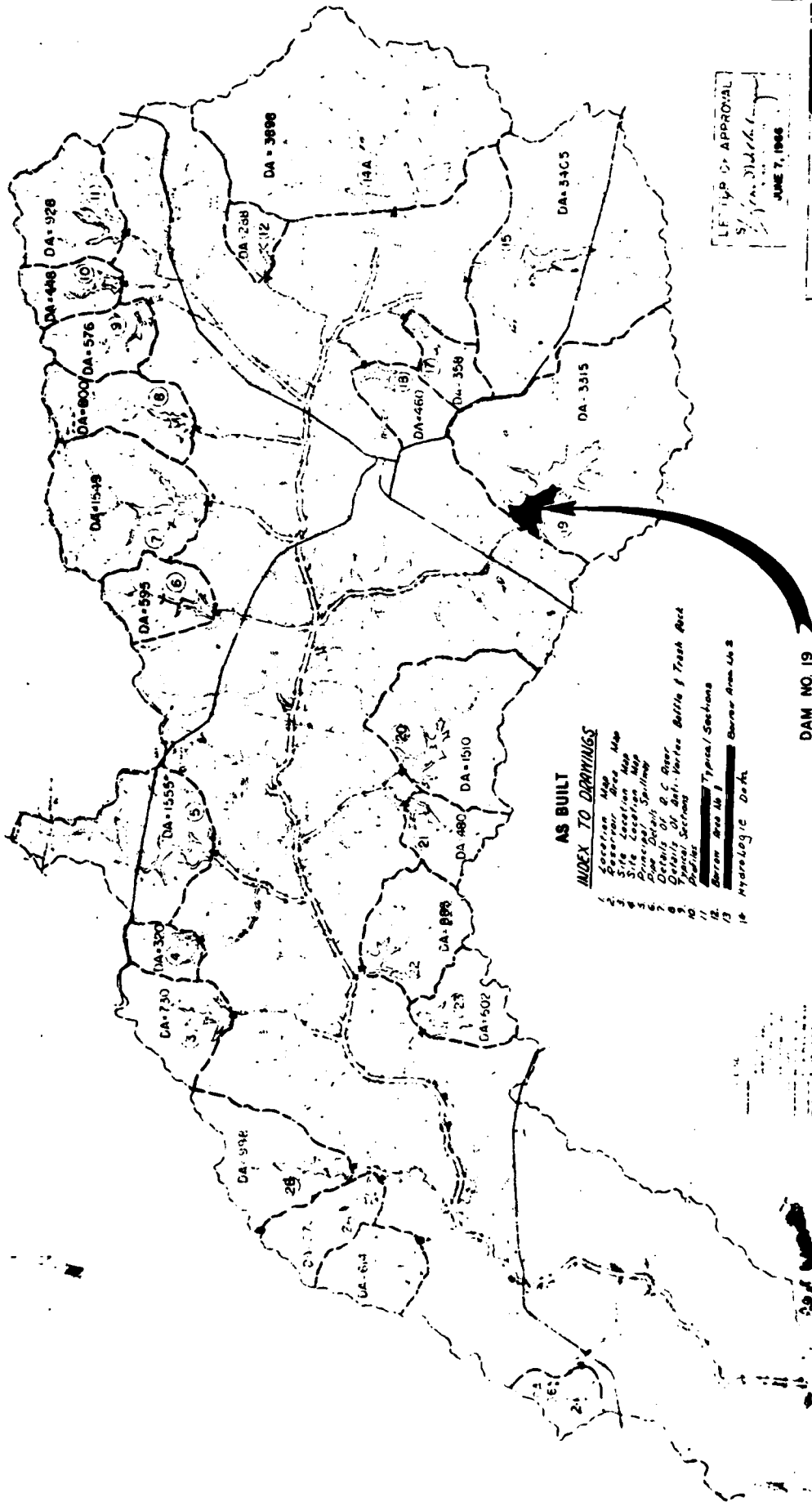
OHIO RIVER DIVISION, NASHVILLE DISTRICT

SOIL TEST DATA SUMMARY

PROJECT CANE CREEK No. 19 HOLE 1 ELEV. TOP _____ SHEET 1 OF 1 SHEETS

[illegible]

APPENDIX E
AS BUILT DRAWINGS



AS BUILT

INDEX TO DRAWINGS

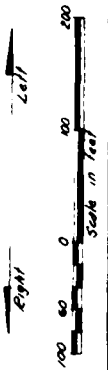
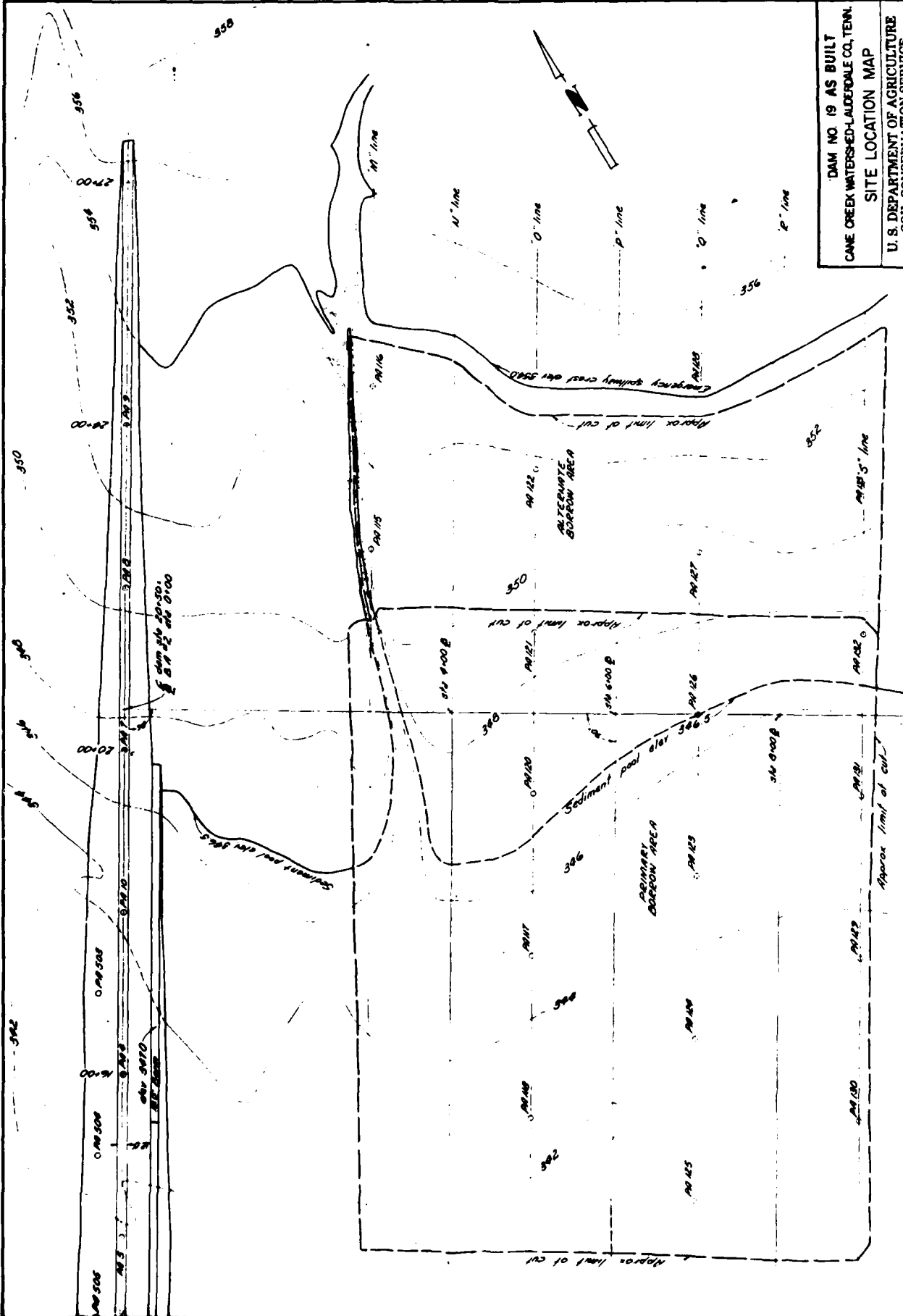
1. Location Map
2. Barrier Map
3. Site Location Map
4. Site Location Map
5. Dam Location Map
6. Dam Location Map
7. Details of R.C. River
8. Details of R.C. River
9. Typical Section
10. Typical Section
11. Typical Section
12. Typical Section
13. Typical Section
14. Hydrologic Data

LETTER OF APPROVAL
5/1/66 JLD/LL
JUNE 7, 1966

DAM NO 19

DAM NO 19 AS BUILT
CANE CREEK WATERSHED - LAUDERDALE COUNTY, FLA.
LOCATION MAP
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
CHARTERED & BUILT 4-68
CARTOGRAPHIC 4-68
4-E-21,881

DAM NO. 19 AS BUILT	
CANE CREEK WATERSHED-LAUDERDALE CO., TENN.	
SITE LOCATION MAP	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Drawn by: CHAMBERLAIN & SCOTT	Checked by: [Signature]
Scale: 1" = 400'	Sheet: 4-E-21.881
Project: [Blank]	Date: [Blank]

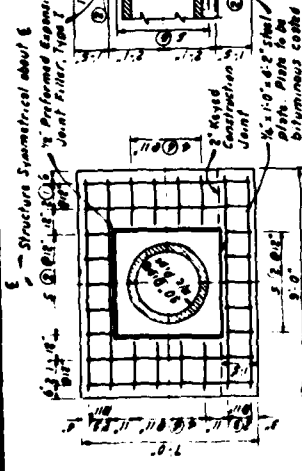


DAM NO. 19 AS BUILT
CAVE CREEK WATERSHED-LAUDERDALE CO, FLA.
PRINCIPAL SPILLWAY- PLAN & SECTION
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

DATE: 4-21-88
BY: [Signature]
CHECKED BY: [Signature]
APPROVED BY: [Signature]

Scale: 1" = 40'-0"
1" = 40'-0"
1" = 40'-0"

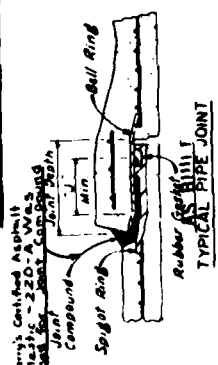
Drawn by: CHARTREE & BORTZ
Checked by: BEATTY
1" = 40'-0"
1" = 40'-0"
1" = 40'-0"



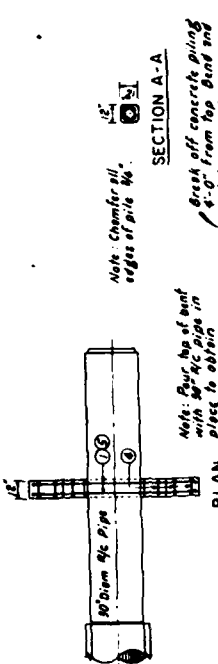
AS BUILT SECTION ALONG C OF PIPE ON BI - BEDDING

SECTION ALONG C PIPE

AS BUILT DETAILS OF ANTI-SEEP COLLAR



AS BUILT
TYPICAL PIPE JOINT



ways to obtain uniform bearing

SECTION A-A

to bend and
know.

[illegible]

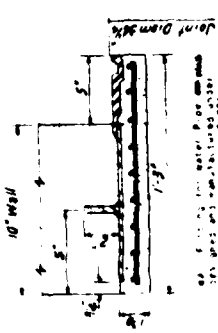
QUANTITIES	
Reinforcing Steel #3 Bars	230 Lbs. Fl. 865 Lbs. (Bent)

AS BUILT SCHED. SCHEDULE FOR ONE ANT.-STEP COLUMN					
Location	Area	Size	Grade	Type	C
Ant.-Step Column B-1	N	10	0'-0"	51	28'-0"
Ant.-Step Column B-2	N	10	0'-0"	51	28'-0"
Ant.-Step Column B-3	N	8	0'-6"	51	34'-0"
Ant.-Step Column B-4	N	8	2'-0"	51	10'-0"
Ant.-Step Column B-5	N	8	8'-0"	51	35'-0"
Ant.-Step Column B-6	N	8	2'-6"	51	35'-0"
Ant.-Step Column B-7	N	10	0'-0"	51	12'-0"

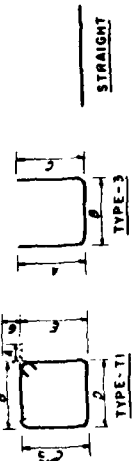
QUANTITIES	
Reinforcing Steel in Bars	133.0 Lbs. 88.84 lbs.

LONGITUDINAL SECTION

AS BUILT DETAILS OF PIPE SUPPORT



AS BUILT
DETAILS OF WALL FITTING



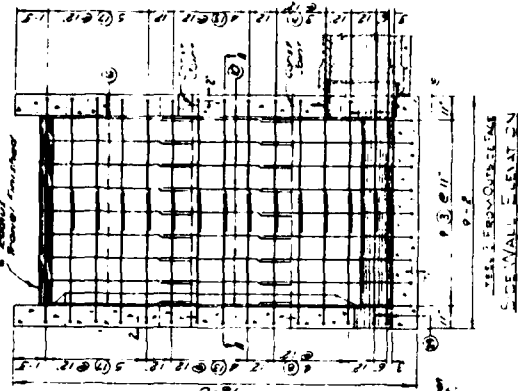
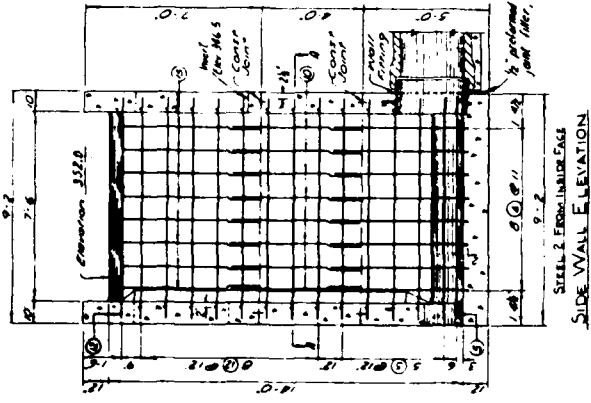
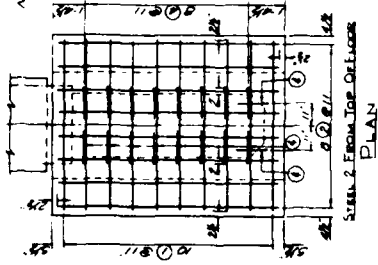
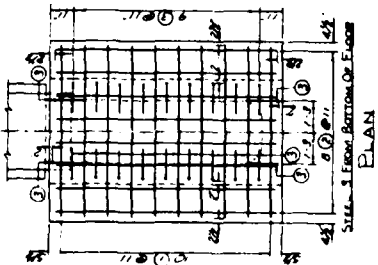
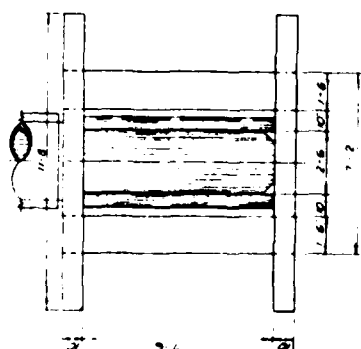
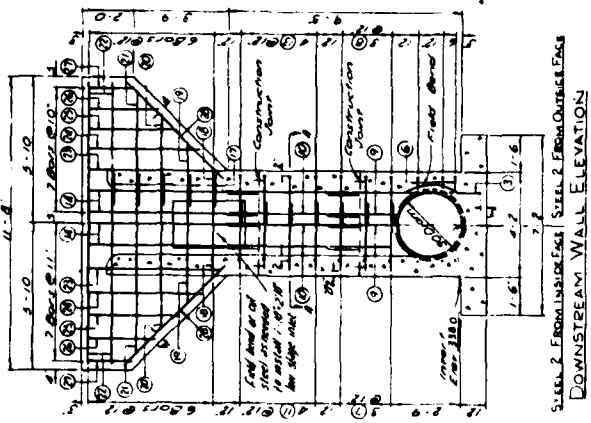
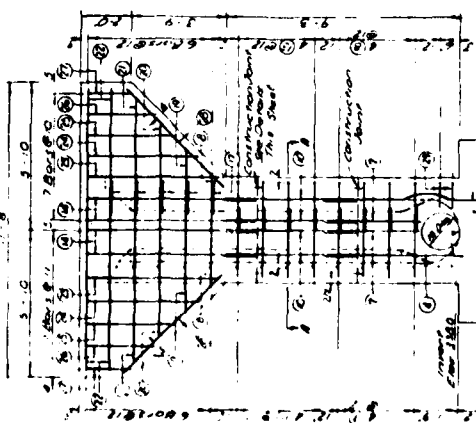
BAR TYPES

STRAIGHT

Note: Minimum radius of oil bands to be 4 times bar diameter.

DAM NO. 19 AS BUILT CANE CREEK WATERED - LAUDERDALE CO., FLORIDA PIPE DETAILS	U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	Inspected by <i>red</i> Date <i>4-21-61</i> Approved by <i>red</i> Date <i>4-21-61</i> Drawn <i>red</i> Date <i>4-21-61</i>
---	--	--

SECTION A-A



STEEL SCHEDULE																	
LOCATION	MEMBER	SIZE	QUANTITY	LENGTH	TYPE	A	B	FORM FEET	LOCATION	MEMBER	SIZE	QUANTITY	LENGTH	TYPE	A	B	FORM FEET
FLOOR	C-11	4	120	6'-0"	31			133'-0"	Basement Wall	C-11	4	10'-6"	51				42'-0"
	C-12	4	8	6'-0"	31			140'-0"		C-12	4	8	11'-3"	51			50'-0"
FLOOR & ROOF	C-13	4	16	6'-0"	31			147'-0"	Basement Wall	C-13	4	8	11'-3"	51			50'-0"
	C-14	4	16	6'-0"	31			154'-0"		C-14	4	8	11'-3"	51			50'-0"
FLOOR & ROOF	C-15	2	12	6'-0"	51			161'-0"	Basement Wall	C-15	4	8	11'-3"	51			50'-0"
	C-16	2	12	6'-0"	51			168'-0"		C-16	4	8	11'-3"	51			50'-0"
ROOF	C-17	4	8	6'-0"	31			175'-0"	Basement Wall	C-17	4	8	11'-3"	51			50'-0"
	C-18	4	10	6'-0"	31			182'-0"		C-18	4	8	11'-3"	51			50'-0"
ROOF	C-19	4	4	6'-0"	51			189'-0"	Basement Wall	C-19	4	8	11'-3"	51			50'-0"
	C-20	4	4	6'-0"	51			196'-0"		C-20	4	8	11'-3"	51			50'-0"
ROOF	C-21	4	8	6'-0"	31			203'-0"	Basement Wall	C-21	4	8	11'-3"	51			50'-0"
	C-22	4	16	6'-0"	31			210'-0"		C-22	4	8	11'-3"	51			50'-0"
ROOF	C-23	4	16	6'-0"	31			217'-0"	Basement Wall	C-23	4	8	11'-3"	51			50'-0"
	C-24	4	16	6'-0"	31			224'-0"		C-24	4	8	11'-3"	51			50'-0"
ROOF	C-25	4	16	6'-0"	31			231'-0"	Basement Wall	C-25	4	8	11'-3"	51			50'-0"
	C-26	4	16	6'-0"	31			238'-0"		C-26	4	8	11'-3"	51			50'-0"
ROOF	C-27	4	16	6'-0"	31			245'-0"	Basement Wall	C-27	4	8	11'-3"	51			50'-0"
	C-28	4	16	6'-0"	31			252'-0"		C-28	4	8	11'-3"	51			50'-0"
ROOF	C-29	4	16	6'-0"	31			259'-0"	Basement Wall	C-29	4	8	11'-3"	51			50'-0"
	C-30	4	16	6'-0"	31			266'-0"		C-30	4	8	11'-3"	51			50'-0"

</

TABLE STRAIGHT
Note. Minimum Radius Of All Bends To Be 4 Times Bar Diameter.

Summary

BAG TYPES

NOTE PLACE HORIZONTAL STYEL 2' FROM FACE

DAM NO. 19 IS AS BUILT
SCANE CREEK WATERWASH - LAUDERDALE CO. TENN.
DETAILS OF 2'-6" X 7'-6" REINFORCED CONCRETE RISP
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

CHASTREE & SCOTT 4-00
BANDERS 4-00

4-E-21,88)

Standard Drawing No. 2-260328-A

100 35474A

五

Standard Drawing No. 2-2-60 326-A

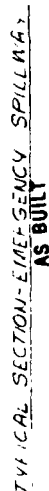


Diagram illustrating a Class 'Y' connection. The structure is shown in cross-section, with dimensions 1 and 2 indicated. The connection is labeled 'CLASS "Y" CONNECTION'. The ground level is marked as 'NATURAL GROUND'. The foundation is labeled 'FOUNDATION', and the stairing line is labeled 'STAIRING LINE'.

TYPICAL SECTION - STREAM CHANNEL
CLEANOUT
AS BUILT

NOTE 1166 LIN. FT. OF DIAPHRAGM LIGURES. NOTE
CONSTRUCTED IN THE MOUNTAIN AREA.
ENTER ENCL. SILLMAN, AND EMBARKMENT AREA AFTER
ALL ACTIVATIONS MADE AND FILL IN PLACE.
THEY ARE LOCATED AS DESIGNATED B, THE
ENGINEER



LESSON LITCH
MINIMUM SECTION

[illegible]

DAM NO 19 AS BUILT

TYPICAL SECTIONS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

...CRABTREE & SCOTT 4-05
SANDNER 4-05

WATSON

4-E-21,881

LATERAL ST. BRIDGE
 NE. 1/4 Sec. 5, T. 14 N., R. 10 E., S. 10 W.
 1/2 mi. S. of L. 1000 ft. C.R.
 1/2 mi. S. of L. 1000 ft. C.R.
 1/2 mi. S. of L. 1000 ft. C.R.
 1/2 mi. S. of L. 1000 ft. C.R.
 1/2 mi. S. of L. 1000 ft. C.R.

E. Dam Sta. 201
 1/2 mi. S. of L. 1000 ft. C.R.

E. Dam Sta. 201
 1/2 mi. S. of L. 1000 ft. C.R.

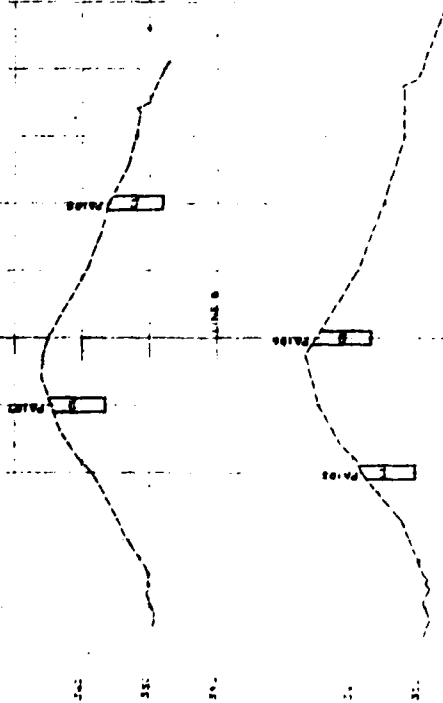
PROFILE ALONG E. EMERGENCY SPILLWAY

PROFILE ALONG E. CONDUIT TRENCH & OUTLET CHANNEL

PROFILE ALONG E. EMBANKMENT

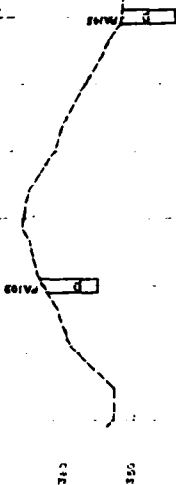
DAM NO. 19 AS BUILT	
CAVE CREEK WATERSHED-LADDERDALE CO., TENN.	
PROFILES	
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
CHARTERED BY SCOTT	4-88
BEATY	4-88
4-E-21-881	

**BORROW AREA NO. 1
ALTERNATE 1BA**



NOTE: ALL SOIL CLASSIFICATION ARE FIELD CLASSIFICATION

LINE B



LINE C



LINE B

LINE E



LINE A

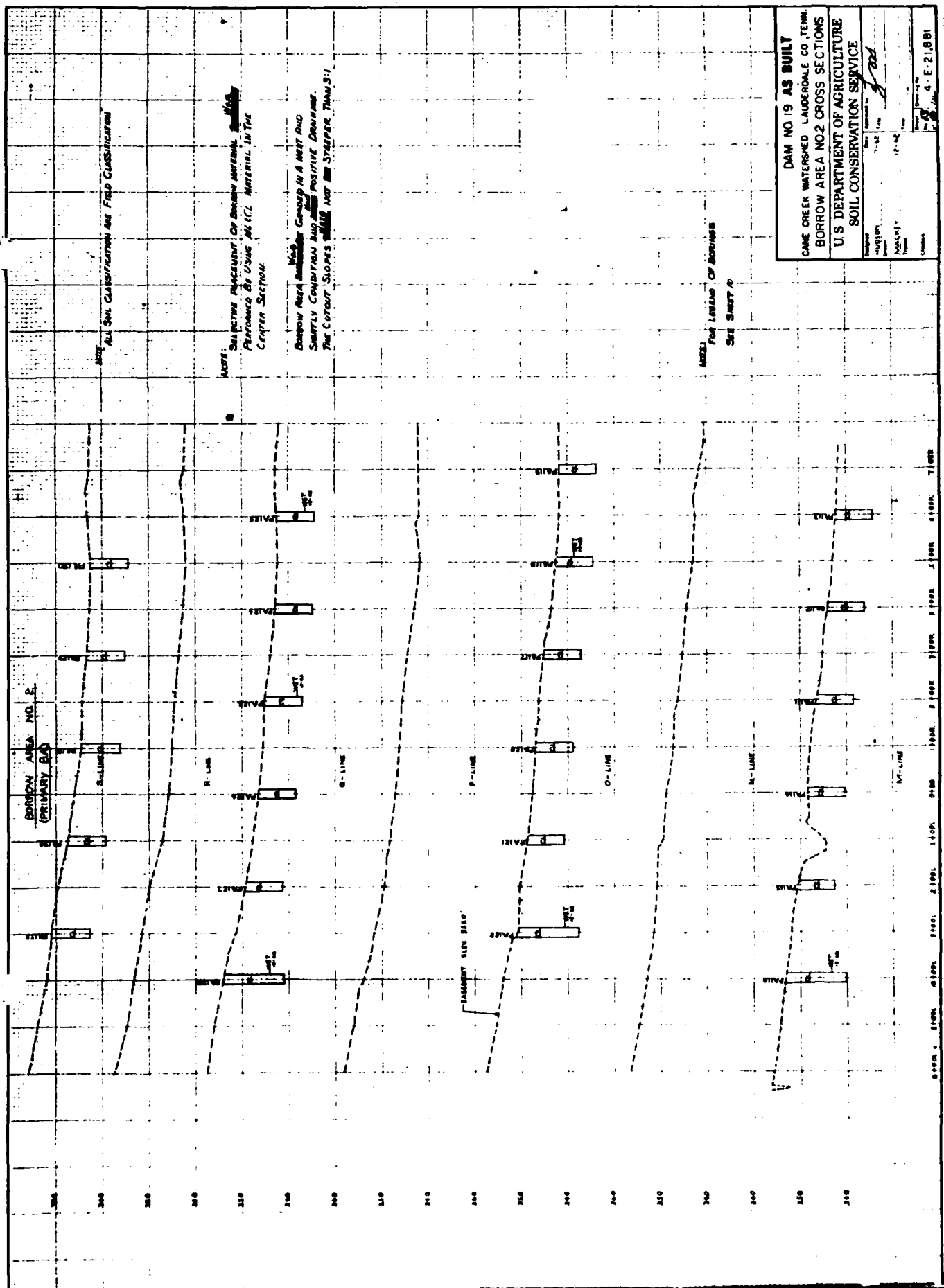
NOTE: SELECTIVE PURCHASE OF BORROW MATERIAL PERMITTED BY LOANS MATERIALS IN THE CENTER SECTION.

BORROW AREA NO. 1B GAINED IN A HEAT AND SLOPE CONDITION AND POSITIVE DRAINAGE. THE CUT OUR SLOPE SHALL NOT BE STEEPER THAN 3:1

NOTE: FOR CLASS OF BORROW SEE SHEET 10

DAM NO. 19 AS BUILT
CANE CREEK WATERSHED - LAUDERDALE CO., FLOR.
BORROW AREA NO. 1 CROSS SECTIONS
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Project	Sheet	Scale	Date
Drawn by	Checked by	Approved by	
Field	Office	Location	
4-21-80			



DAM NO 19 AS BUILT	
CAME CREEK WATERSHED LAUDERDALE CO. FLA.	
BORROW AREA NO 2 CROSS SECTIONS	
U.S. DEPARTMENT OF AGRICULTURE	
SOIL CONSERVATION SERVICE	
Project No.	4-E-21881
Location	
Scale	
Drawn by	
Checked by	
Approved by	
Date	

APPENDIX F
HYDRAULIC AND HYDROLOGIC DATA

HYDRAULIC AND HYDROLOGIC ANALYSIS

According to OCE guidelines, Cane Creek Watershed Dam No. 19 must be able to safely pass the full Probable Maximum Flood (PMF). Six hour rainfall depths for the Probable Maximum Precipitation and the 100 year rainfall were obtained from the U. S. Weather Service's Technical Paper 40. Flood routings were performed using the HEC-1-CB computer program. The program uses the dimensionless hydrograph technique described in Section 4 of the Soil Conservation Service National Engineering Handbook and the modified Puls method of reservoir routing.

The peak outflow from the PMF (AMC II) is 26,400 cfs. This flood overtops the dam by 2.4 feet for 7.2 hours.

SUMMARY OF ROUTINGS

EVENT	ANTECEDENT MOISTURE CONDITION	
	II	III
PMF	Overtops by 2.4 feet for 7.2 hours	Overtops by 2.5 feet for 7.5 hours
$\frac{1}{2}$ PMF	Overtops by 1.0 feet for 5.7 hours	Overtops by 1.1 feet for 5.5 hours
100 - YEAR	Maintains 4.7 feet of freeboard	Maintains 3.3 feet of freeboard

Additional spillway capacity required:

25,600 (AMC II)
28,000 (AMC III)

WATERSHED DATA

DRAINAGE AREA = 335 ACRES = 5.18 SQ. MILES
L = MAXIMUM LENGTH OF WATERCOURSE = 14,500 FEET
V = AVERAGE VELOCITY = 2.21 FEET PER SECOND
 T_c = TIME OF CONCENTRATION = $\frac{L}{3600V}$ = HOURS
 $T_c = \frac{14500}{3600 \times 2.21} = \underline{1.36}$ HOURS

DRAINAGE AREA = 33.5 ACRES = 5.19 SQ. MILES
L = MAXIMUM LENGTH OF WATERCOURSE = 14,800 FEET
V = AVERAGE VELOCITY = 2.21 FEET PER SECOND
 $T_c = \text{TIME OF CONCENTRATION} = \frac{L}{V} = \frac{14,800}{2.21} = \text{HOURS}$
 $T_c = \frac{14,800}{2.21} = \frac{6,700}{1.38} = \text{HOURS}$

LAND USE OR COVER	TREATMENT OR PRACTICE	HYDROLOGIC CONDITION	SOIL NAME	SOIL GROUP	ACRES	CURVE NO	CURVE NO x ACRES
IDLE				B	473	79	27,327
ROW CROP	STR ROW	POOR		B	364	A1	29,484
		FAIR			323	B6	28,194
	CONToured	FAIR		P	415	77	25,235
	CONTOUR STRIPED	FAIR		B	91	73	6,643
HAY				B	265	58	21,170
PASTURE				B	458	63	28,854
WOODS				B	726	72	52,392
				C	5	88	440
ROADS				B	16	26	1,316
				C	1	87	87
STREAMS				B	87	16	9,700
CRITICAL AREA				B	51	86	4,386

TOTAL NO.	345	Σ	34542
-----------	----------------	----------	------------------

WEIGHTED CURVE No. • $\frac{2 \text{ CURVE No. } \times \text{ ACRES}}{\text{Total No. ACRES}}$ = 3.2

WEIGHTED CURVE No. • $\frac{248 \times 982}{2000}$ = 123.2

DESCRIPTION	REMARKS
<p>1. [Illegible text]</p> <p>2. [Illegible text]</p>	<p>[Illegible text]</p>
<p>3. [Illegible text]</p>	<p>[Illegible text]</p>
<p>4. [Illegible text]</p>	<p>[Illegible text]</p>
<p>5. [Illegible text]</p>	<p>[Illegible text]</p>
<p>6. [Illegible text]</p>	<p>[Illegible text]</p>
<p>7. [Illegible text]</p>	<p>[Illegible text]</p>
<p>8. [Illegible text]</p>	<p>[Illegible text]</p>
<p>9. [Illegible text]</p>	<p>[Illegible text]</p>
<p>10. [Illegible text]</p>	<p>[Illegible text]</p>

CLASS .. STRUCTURE

DAM NO. 11
 FINE CREEK WATER WHEEL
 UNDERPAVE COMPANY, TOWN OF
 HYDROLOGIC DATA & INFLOW HYDROGRAPH COMPUTATIONS
 U.S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE

Assigned	Date	Approved By
By		Date
Drawn		
Traced		
Checked		

Sheet	Drawing No.
4	4-E-21,881-A

CANE CREEK WATSHD. DAM #19

EMER. SPIL RATING:

$$\text{CREST EL.} = 354.3$$

$$S = 90'$$

$$SS \approx 4.6' \text{ H/V}$$

$$H_d = 2.1'$$

Q IN TRAPEZOIDAL CHANNEL WHEN Q IS AT CRIT. DEPTH: $Q = C B H_m^{3/2}$

$$\frac{H_m(Z)}{B} = \frac{2.1(4.6)}{90} = 0.121 \rightarrow C = 3.24$$

$$Q = 3.24 (90) (2.1)^{3/2} = 815 \text{ cfs}$$

ABOVE CRITICAL SECTION, WATER WILL BE 250.4 (TOP OF DAM) AND FLOW DOWN TO THE VALLEY CHANNEL CROSS-SECTION. BECAUSE OF THE 5 EL. THE CRIT. EL. WILL BE CONSIDERED TO REMAIN CONSTANT THROUGH THE CHANNEL. STILL, WE CAN HAVE A TRAPEZOID:

$$\frac{Q^2}{g} = \frac{A^3}{T}$$

H _d (FT)	WTR. EL. @ CRIT. SECT. (MSL)	A (SQ)	Q (CFS)	$\frac{Q^2}{g}$ (SQ)	LAKE EL. (MSL)
1	355.0	94.6	256	0.14	355.0
1.5	355.8	130	479	0.21	355.0
2.1	356.4	97	813	0.35	356.7
2.1	357.4	287	2772	1.45	356.7
4.1	359.4	730	4308	1.75	359.4

PRINCIPAL ALLOWANCE RATING

① LOW STAGE ORIFICE - H_d = 2.1' (CRIT. DEPTH) - Q = 815 CFS

$$Q = C L H^{3/2}$$

WATER FLOW FROM
DAM TO VALLEY OR
ORIFICE

H _d (FT)	WTR. EL. (MSL)	Q (CFS)
0	346.5	0
2.5	351.5	1213
4.5	356.5	2401
6.5	361.5	3472
8.5	366.5	4424

② HIGH STAGE - WATER FLOW FROM VALLEY

$$Q = C L H^{3/2}$$

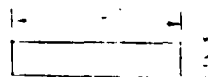
H _d (FT)	WTR. EL. (MSL)	Q (CFS)
0	352	0
1	353	40

③ HIGH STAGE ORIFICE FLOW - H_d = 2.1'

$$Q = C L H^{3/2}$$

$$Q = 3.24 (90) (2.1)^{3/2}$$

H _d (FT)	WTR. EL. (MSL)	Q (CFS)
0	352	0
1.5	354	97
2.5	356.4	150
4.5	359.4	173



SPILLWAY RATING (CONTINUED)

④ PIPE FLOW:

BERNOULLI EQU.

$$Q = A \sqrt{\frac{2gH}{1 + K_e + K_b + K_d L}}$$

$$Q = 9.91 \sqrt{\frac{2gH}{L = 0.5 + 0 + 0.0001(16)}}$$

$$Q = 10.8 \sqrt{H}$$

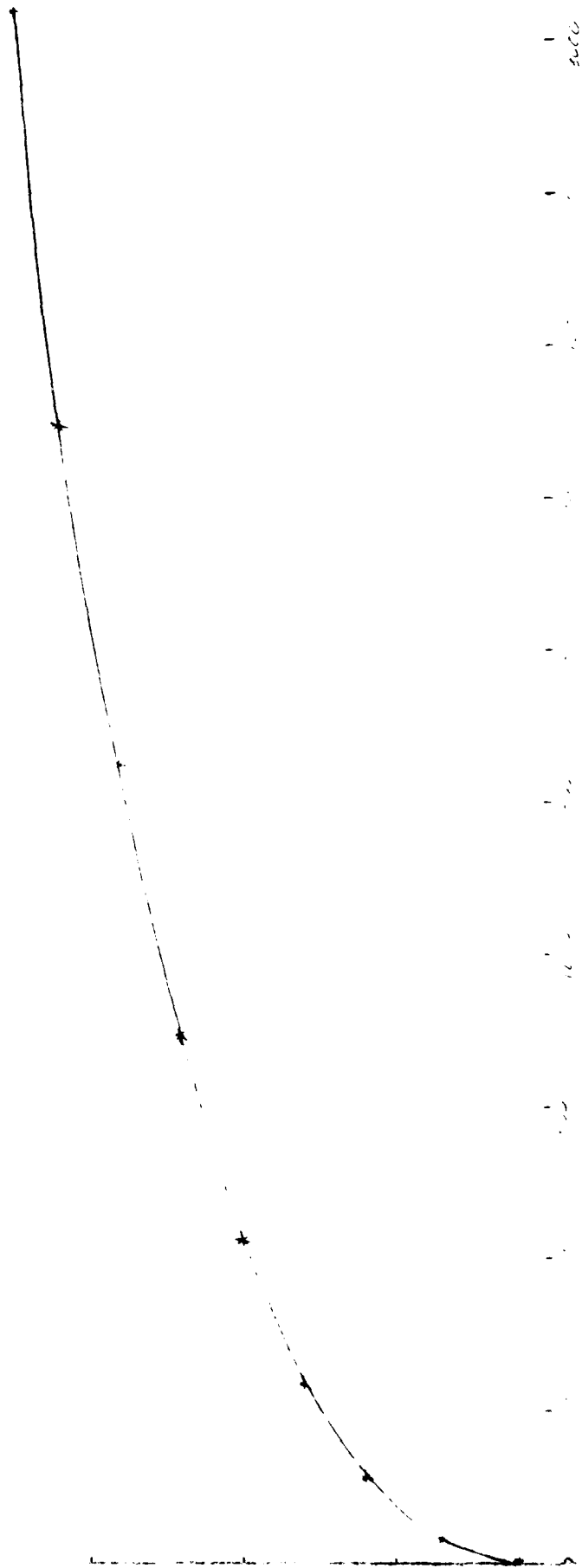
$$K_d = \frac{5000 \text{ ft}^2}{D^{4/3}}$$

$$= \frac{5000 (0.25)^2}{30^{4/3}}$$

$$= 0.0001$$

H (ft)	DEPTH (ft)	Q (cfs)
0	0.00	0
8.5	04.5	70
15	30.0	92
18.4	32.0	102
20	33.0	106

CANE CREEK WTSHD DAM #19
 EL. VS. STORAGE
 (FROM SCS DESIGN
 CALCULATIONS - INCLUDES
 SEDIMENT POOL)



1
 sec

1

1

1

1

1

1

1

1

1

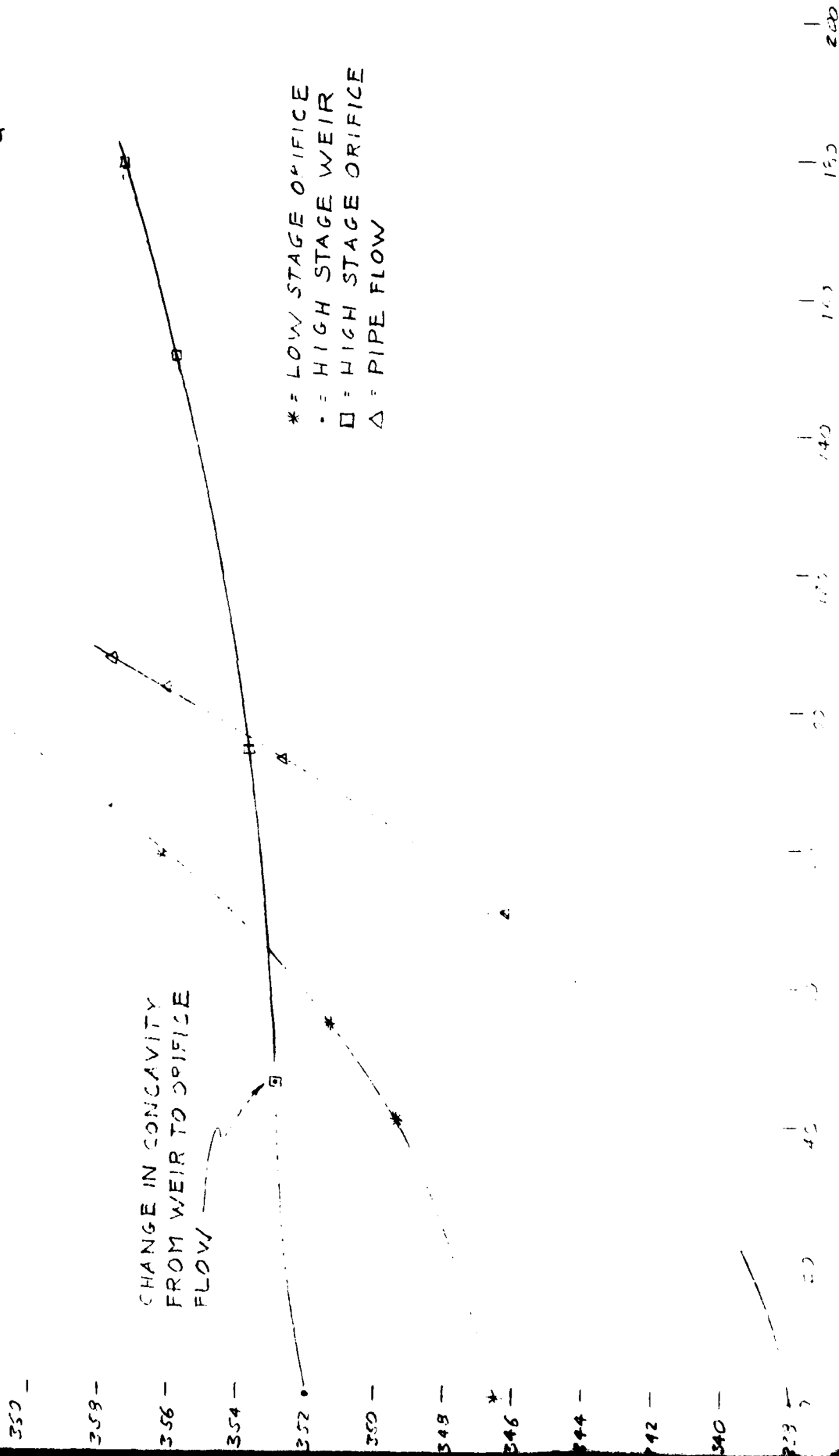
1

STORAGE (A.C.F.)

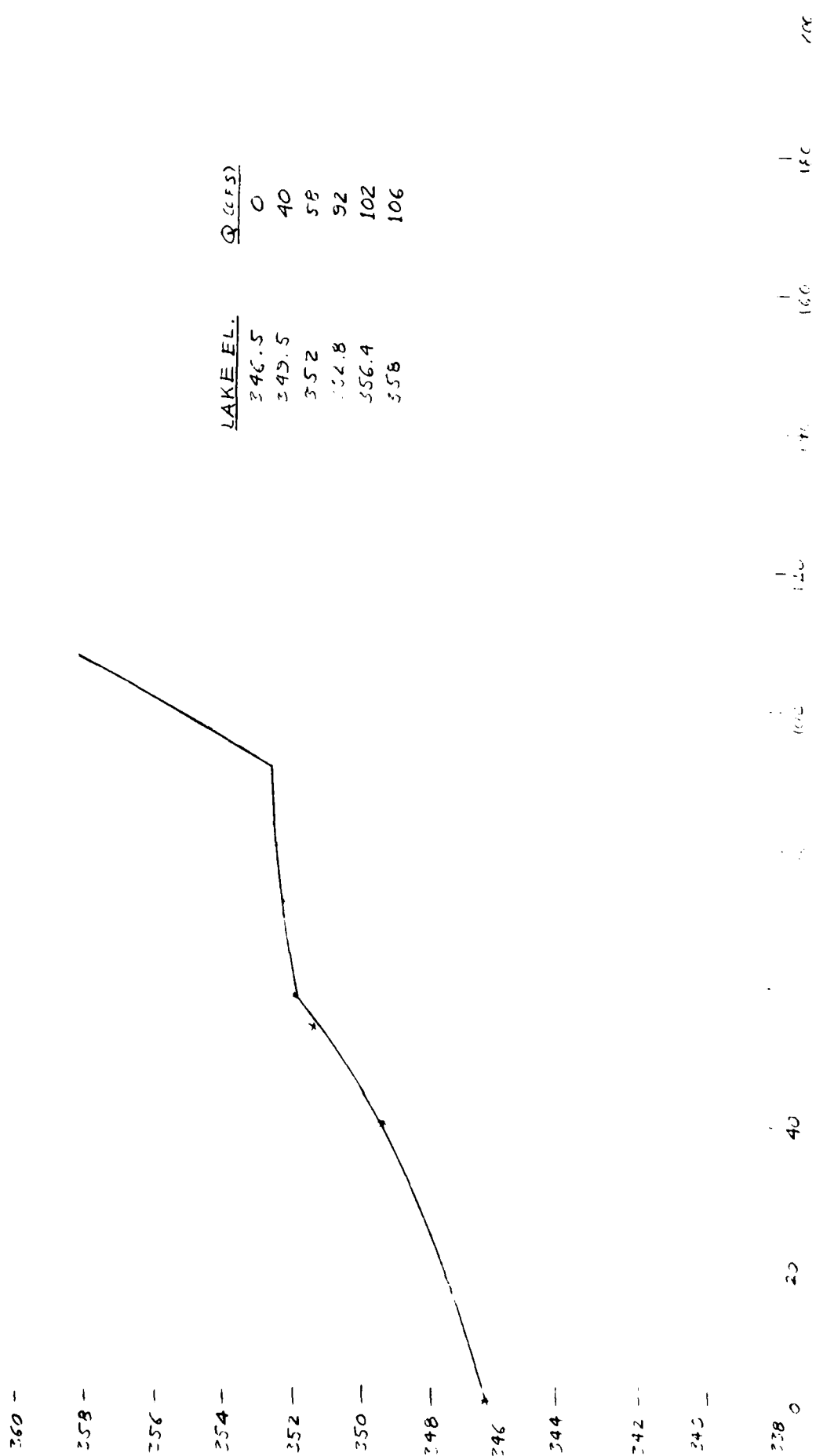
CANE CREEK WATSHD #19
 PRINCIPAL SPILLWAY RATING
 FOR DIFFERENT MODES OF
 FLOW. LK EL. VS. Q

- * = LOW STAGE ORIFICE
- = HIGH STAGE WEIR
- = HIGH STAGE ORIFICE
- Δ = PIPE FLOW

CHANGE IN CONCAVITY
 FROM WEIR TO ORIFICE
 FLOW

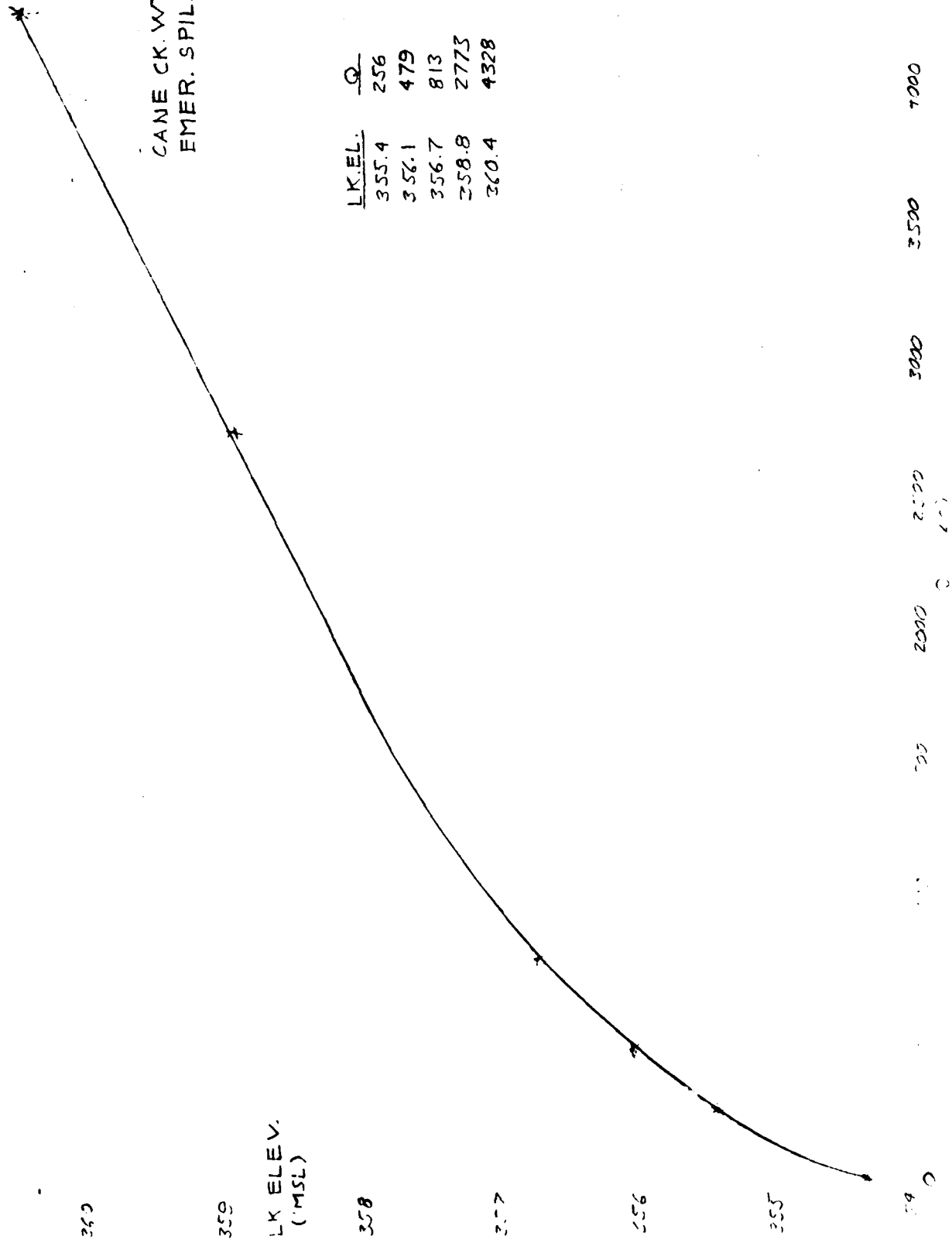


CANECK. WTSHD DAM #19
 COMPOSITE PRINCIPAL SPIL.
 RATING: LK. EL. VS. Q



CANE CK. WTSHD DAM #19
EMER. SPIL. RATING CURV

LK. EL.	Q
355.4	256
356.1	479
356.7	813
358.8	2773
360.4	4328



LK ELEV.
(MSL)

Q

E>

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	END-OF-PERIOD FLOW	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP G
						COMP G							
SUM 29.78 86.13 3.66 871899. (757.)(664.)(93.)(24690.02)													

XXXXXXXXXX

XXXXXXXXXX

XXXXXXXXXX

XXXXXXXXXX

XXXXXXXXXX

HYDROGRAPH ROUTING

ROUTING PARAMETERS

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	1	0	1	0	0

ROUTING DATA
ISAME 1
IOPT 0
LSTR 0

LAG	ANCK	X	TSK	STORA	ISPRAT
0	0.000	0.000	0.000	-347.	-1

ISTPS	NSTD	LAG	ANCK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-347.	-1

STAGE	346.50	349.50	352.00	352.80	354.00	354.60	355.40	356.10	356.70
353.80									
FLOW	0.00	40.00	58.00	98.00	96.00	147.00	355.00	500.00	910.00
2081.00									
4440.00									

CAPACITY=	0.	24.	171.	453.	857.	1392.	2061.	2879.
-----------	----	-----	------	------	------	-------	-------	-------

ELEVATION=	346.	347.	348.	350.	352.	354.	356.	358.
------------	------	------	------	------	------	------	------	------

CREL	SPUD	COOL	EXPU	ELEUL	COOL	CAREA	EXPL
346.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA		
TOREL	COOL	EXPD
356.4	3.1	1.5
2415.	2550.	2550.

CREST LENGTH	0.	1276.	1000.
AT OR BELOW			
ELEVATION	356.4	356.7	356.8

PEAK OUTFLOW IS	56. AT TIME 20.40 HOURS
-----------------	-------------------------

PEAK OUTFLOW IS	0000. AT TIME 18.00 HOURS
-----------------	---------------------------

PEAK OUTFLOW IS	00007. AT TIME 18.00 HOURS
-----------------	----------------------------

RUN DATE: 81/06/29.
TIME: 08.53.05.

```

NO      100
NHR     0
NWIN    6
IDAY    0
JOPER   5
NUT     0
LROPT   0
METRIC   0
TRACE    0
IPLT     0
IPRT     4
NSTAN    0

```

RTIOS=	.11	.50	1.00	MULTI-PLAN ANALYSES TO BE PERFORMED
				NPLAN= 1 NRTIO= 3 LRTIO= 1

[illegible]

SUB-AREA RUNOFF COMPUTATION

HYDROGRAPH PARAMETERS

INHYDG	ZUNG	TAREA	SNAP	HYDROGRAPH DATA	RATIO	ISNOU	ISAVE	ISTAGE	IAUTO
1	2	5.18	0.00	THSDA	0.000	0	1	0	0
				TRSPC	1.00	0			
				5.18					
				IECON	0				
				ITAPE	0				
				JPLT	1				
				JPART	0				
				ICOMP	0				
				ISTAQ	1				

	R06	R72	R48	R24	R6	PMS	SPFE
PRECIP DATA							
	R06	R72	R48	R24	R6	PMS	SPFE
	0.00	0.00	0.00	102.00	100.00	29.00	0.00

LRPOT	0
STKRK	0.00
DLTKR	0.00
RTIOL	1.00
ERRIN	0.00
STNKS	0.00
LOSS DATA	
RTIOX	1.00
STRTL	-1.00
CNSTL	-75.00
ALSRX	0.00
RTIMP	0.00

CURVE NO - -75.00 WETNESS - -1.00 EFFECT CN - 75.00

UNIT HYDROGRAPH DATA
TC= 0.00 LAG= .83

STRATQ= 0.00 RECESSION DATA RTIOR= 1.50
ORCSH= 1.00

END-OF-PERIOD FLOW

1

XXXXXXXXXX

XXXXXXXXXX

XXXXXXXXXX

XXXXXXXXXX

XXXXXXXXXX

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION STATION AREA PLAN RATIO 1 RATIO 2 RATIO 3 RATIOS APPLIED TO FLOWS
.11 .50 1.00

HYDROGRAPH AT 1 5.18 3541. 15806. 31813.
(13.42) (100.26)(447.89)(866.18)(

ROUTED TO 2 5.18 56 6586 26357.
(13.42) (1.59)(186.49)(746.36)(

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1

INITIAL VALUE SPILLWAY CREST TOP OF DAM
348.50 356.40
24. 2285.
0. 748.

ELEVATION
STORAGE
OUTFLOW

RATIO OF PWF .11
.50
1.00
MAXIMUM DEPTH OVER DAM 0.00
1.02
2.37
MAXIMUM STORAGE AC-FT 805.
2643.
3193.
MAXIMUM OUTFLOW CFS 55.
6586.
26357.
DURATION OVER TOP HOURS 0.00
5.70
7.80
TIME OF MAX OUTFLOW HOURS 20.40
18.00
16.00
TIME OF FAILING HOURS 0.00
0.00
0.00

XXXXXXXXXXXXXXXXXXXXXXXXXXXX
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 01 APR 80
XXXXXXXXXXXXXXXXXXXXXXXXXXXX
EOT.
E

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1

ELEVATION
STORAGE
OUTFLOW

INITIAL VALUE
348.50
84.
0.

SPILLWAY CREST
348.50
84.
0.

TOP OF DAM
351.50
84.
7.0

RATIO
OF
PPF

MAXIMUM
RESERVOIR
U.S.ELEV

MAXIMUM
DEPTH
OVER DAM

MAXIMUM
STORAGE
AC-FT

MAXIMUM
OUTFLOW
CFS

DURATION
OVER TOP
HOURS

TIME TO
MAX. OUTFLOW
HOURS

TIME OF
FAILURE
HOURS

352.10
357.53
358.50

0.00
1.13
2.50

1152.
2887.
3847.

83.
7754.
25779.

0.00
5.00
7.50

50.00
17.50
18.70

0.00
0.00
0.00

1.00
FLOOD HYDROGRAPH PACKAGE (NEG-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 01 APR 80
E01.

APPENDIX G
CORRESPONDENCE

RAU 1/20
EBU 1/27
SD
RECEIVED
FILE
JAN 20 1981

DEPT. OF CONSERVATION
WATER RESOURCES

105 Herron Dr.
Knoxville, Tenn. 37919
January 17, 1981

Mr. Robert A. Hunt, P.E.
Director, Division of Water Resources
4721 Trousdale Dr.
Nashville, Tenn. 37220

Dear Mr. Hunt:

This is to acknowledge receipt of your letter of December 30, 1980 concerning the inspection of Cane Creek Dam Number 19 and to request that my address be changed to:

Charles R. Walker
105 Herron Dr.
Knoxville, Tenn. 37919.

Very truly yours,


Charles R. Walker

CRW/rdw

105 Herron Dr.
Herron Dr.
Knoxville, Tn. 37919
July 15, 1981

RECEIVED

JUL 20 1981

DEPT. OF CONSERVATION
WATER RESOURCES

Mr. William H. Culbert, Jr.
Division of Water Resources
4721 Trousdale Dr.
Nashville, Tn. 37219

Dear Mr. Culbert:

I have been out of town for the last five weeks which accounts for your not being able to reach me by phone.

My brother, Thomas J. Walker, managed the farm for me until last summer. I had to take over due to his failing health. I have answered the questions of which I have knowledge. Mr. James W. Koonce rented the land during construction and is still renting it. He may be able to answer your other questions. His address is

Rt. #6, Ripley, Tn. 38063

Sincerely yours,

Charles R. Walker
Charles R. Walker

CRW/rdw

Was the dam built in 1962? _____

Was the contractor Hugh Dancey? _____

Does he have a construction company or is he freelance? _____

Where is he based (or where does he live)? _____

Are you aware of any significant changes in the drainage area since the dam was constructed? _____

- ✓ Is the lake drained seasonally? _____
- ✓ What is its fluctuation schedule? _____
- ✓ Have any unusual incidents ever occurred with the dam? e.g. localized slope failure. _____
- ✓ During the field survey we discovered that the sediment pool was almost up to the low stage inlet of the riser. When the drawdown is closed, does the water level come all the way up to the high stage inlet, or is it normally maintained in a very shallow pool at the low stage inlet? _____

Have you ever known the water level to flow in the emergency spillway? No If so, how deep? _____

How often? _____

Did you inherit the property from your mother-in-law? _____

No When? _____

What was her name? _____

Was the farm under her ownership named Orysh? _____

Is it still maintained as such? _____

To what extent are you involved with farm operations. _____

I rent the farm and own 1/2 of the cattle.

Additional comments _____

AD-A108 471

TENNESSEE STATE DEPT OF CONSERVATION NASHVILLE DIV O--ETC F/G 13/13
NATIONAL PROGRAM OF INSPECTION OF NON-FEDERAL DAMS, TENNESSEE. --ETC(U)
SEP 81 W CULBERT DACW62-81-C-0056

UNCLASSIFIED

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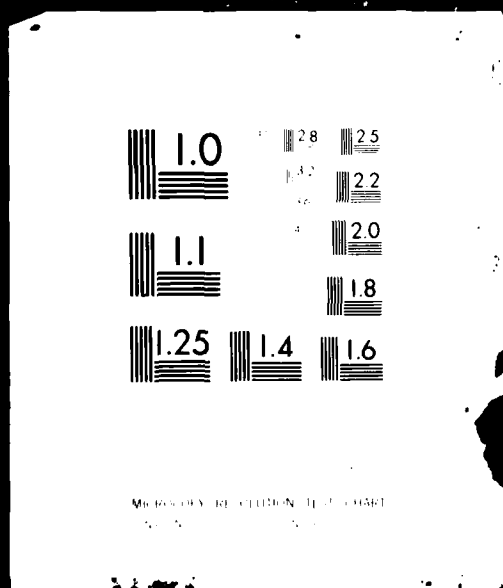
2 2
AL: A
C-14-1
■

END
DATE
FILMED
01-82
DTIC

2 OF 2

AD A

108471





ORNED-G


NON-FEDERAL DAM INSPECTION REVIEW BOARD
PO BOX 1070
NASHVILLE, TENNESSEE 37202


Commander, Nashville District
US Army Corps of Engineers
PO Box 1070
Nashville, TN 37202


1. The Interagency Review Board, appointed by the Commander on 19 June 1981, presents the following recommendations after meeting on 30 July 1981, to consider the Phase I investigation report on Cane Creek Watershed Dam No. 19, inspected by the Tennessee Department of Conservation.
2. A qualified engineer should be engaged to recommend project modifications to allow safe passage of the 1/2 PMF.
3. The Board is in agreement with other report conclusions and recommendations following minor revisions.



FRANK B. COUCH, JR.
Chief, Geotechnical Branch
Chairman


O'GENE W. BARKEMEYER
State Conservation Engineer
Soil Conservation Service


GEORGE MOORE
Alternate, Division of Water Resources
State of Tennessee


H. F. PHILLIPS
Chief, Hydraulics Section
Alternate, Hydrology and Hydraulics
Branch


EDWARD B. BOYD
Hydrologic Technician
Alternate, US Geological Survey


BRADLEY B. HOOT
Chief, Structural Section
Alternate, Design Branch



DEPARTMENT OF THE ARMY
NASHVILLE DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1076
NASHVILLE, TENNESSEE 37202

5 AUG 1991

IN REPLY REFER TO

ORND-G

Honorable Lamar Alexander
Governor of Tennessee
Nashville, TN 37219

Dear Governor Alexander:

Please be informed of the results of an inspection, under authority of Public Law 92-367, conducted on Cane Creek Watershed Dam No. 19 in Lauderdale County, Tennessee. An inspection team, composed of personnel from your Division of Water Resources, observed conditions which indicate a high potential for failure of the embankment due to seriously inadequate spillway capacity.

Cane Creek Watershed Dam No. 19 is classified as a high hazard potential, intermediate size dam, and, as such, should be able to regulate at least a full probable maximum flood (PMF) to conform to inspection program guidelines. An analysis of the hydrology associated with the dam reveals the dam would be substantially overtopped by both a one-half and a full probable maximum flood.

In view of the serious spillway inadequacy, this dam is considered unsafe. While I do not view this as an emergency at this time, I recommend you initiate prompt action by the State to cause the owner to correct the spillway deficiency to minimize the risk to the residences directly below the dam.

A report of the technical investigation will be furnished your office upon completion.

Sincerely,

LEE W. TUCKER
Colonel, Corps of Engineers
Commander

CF:
Mr. Robert A. Hunt, Director
Division of Water Resources
4721 Trousdale Drive
Nashville, TN 37220